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ABSTRACT

The study reported on in this document had as its major objective to analyze the costs that the nation incurs in providing college education for its youth. The results of the "Cost of College" study are based on data obtained from 50 4-year colleges. The data include information on revenues and expenditures, faculty, classes, enrollments, average scholastic aptitude measures, and federal student aid for each of the colleges. The period covered is Fall 1967 through Spring 1971. It was found that the cost of college (the total expenditures divided by the number of students) rose from $2,606 in 1967-68 to $3,341 in 1970-71, or 28.8%, while the cost of living was rising 16.3%. This unusually rapid inflation was generated by 3 major sources: increases in faculty salaries, declining work loads, and declining class sizes. (HS)

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THE COST OF COLLEGE

Arithmetic Errors:

Page No.	Line No.	Error	Correction
28	7	29.9	29.5
34	6	17.3	7.3
35	5	8.8	8.9

Typing Errors:

10	16	Plains	Great Lakes
10	39	Plains	Great Lakes
12	10	Middle Atlantic	Middle East
12	10	9	10
12	11	9	8
12	12	Middle West	West Plains
12	12	6	4
12	14	Southwest and Mountain States	Southwest and Rocky Mountain States
12	14	5	7
12	15	Pacific Coast	Far West
30	29	word 10 thier	their
33	24	word 7 incoem	income
36	10	word 4 analoguous	analogous
43	1	word 6 thier	their
48	14	word 6 IV - 6	IV - 1
48	23	word 11 IV - 6	IV - 1
50	10	word 4 IV - 6	IV - 1
51	35	word 10 collar	dollar
59	14	word 4 sixteen	eighteen
59	23	word 7 directo	direct
61	15	to discrim-	to be discrim-
62	23	become unnecessary	become unnecessary is sufficient.
66	28	word 5 thier	their
73	21	word 8 diminuition	diminution
73	23	word 3 diminuition	diminution
73	44	word 2 elimin ation	elimination

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THE COST OF COLLEGE: II

A report prepared for the Office of Program Planning and Evaluation, U.S. Office of Education, D.H.E.W. under Contract No. OEC-0-70-5023.

COLUMBIA RESEARCH ASSOCIATES
Cambridge, Massachusetts
August 1972

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INTRODUCTION

This Cost of College report follows and is, to some extent, a sequel to the Cost of College report submitted in July 1971. Many of the results there are repeated and expanded upon in the current report. The research effort is sponsored by the Division of Higher Education of the Office of Program Planning and Evaluation, U.S.O.E.

The Cost of College, as the name implies, attempts to analyze the costs which the Nation incurs in providing college education for its youth. Particularly now, when many colleges are coping with severe financial pressures, there is great interest concerning what college costs are, how they came to reach their present levels, what can be done about it, and what should be the role of the Federal government.

We have assumed, in both our methodology and conclusions, that we seek to provide each youth with an opportunity to acquire that type of post-high-school education which is appropriate to his interests and capabilities. We assume, furthermore, that this opportunity should be made available without regard to students' ability to pay. The issue eventually is to design Federal programs which will turn our desires for equal educational opportunity into realities.

To understand better the costs of college requires information of an extent and level of detail not made available by the usual data collection agencies. It is interesting that although a great many studies have made student information available, little exists on institutions as such. The present study concentrates on this area. It is, after all, the colleges themselves which provide the education. Whether they do it well or poorly, efficiently or otherwise, how they allocate their resources and how those allocations are determined are all of central interest.

Beyond this, just how much control do colleges have over either expenditures or revenues? We have not been satisfied with studies which appear to assume (almost always implicitly) that the cost of college must necessarily increase year-by-year at a rate greater than that of, say, the cost of living or the general wage level, and that it is, thus, the responsibility of policymakers to increase revenues rather than reduce expenditures.

Only recently have we begun to accept the conclusion that some, at least, of many colleges' financial difficulties may be a result of inappropriate decisions, both within the colleges themselves--as when objectives are established which exceed reasonable expectations of fulfillment--and in

higher education as a whole--as when all colleges collectively strive to attain nationally inconsistent objectives. It is obviously impossible, for example, for every school simultaneously to raise the entrance standards for its incoming freshman class, but it is equally improbable that an individual institution can do so if it draws from a relatively fixed base of graduating seniors.

We should be aware, too, that "crisis" is manifested in various ways: for some colleges "financial difficulties" imply that new programs must be postponed, for others a close look at marginal programs is being undertaken with an eye to cutting them--and for some, the financial squeeze will force them to close their doors within the next few years. Some of our sample of fifty colleges are financially healthy if not actually robust--and some of these, surprisingly, are almost solely dependent on students' tuitions and fees.

The study is based on a detailed analysis of the financial and operational characteristics of fifty pre-doctoral colleges over the period Fall 1967 to Spring 1971 (FY 1968-71). The initial phase of the study covered the period from (the school year beginning in Fall) 1967-69.

The approach was simply to examine higher education at the institutional level in order to understand better colleges' operations and to establish whether we can evaluate the impacts of alternative programs on those operations. We should also like to clarify whether colleges might, in certain situations, be pursuing self-defeating objectives which would serve to offset whatever positive effects proposed new programs might have.

In any program there is always the possibility that the institution might respond in such a way as to cause unanticipated indirect effects. There can, in fact, be not only second-order but multi-order, subtle effects which may not be apparent if the materials are too severly limited to a single aspect of institutional operation. The Cost of College is thus based on a very substantial amount of data which goes well beyond the obvious questions concerning budgets, finances, and enrollments.

The data for the study was collected during personal visits to each of the campuses over a period from July 1970 to March 1971 and, during the period July 1971 to June 1972, by concentrated telephone and mail follow-up. Our interviews are part of the data and shaped our interpretation of much of the "hard" data; as the amount of "hard" data has increased, we have accordingly relied more on it.

Sometimes, nevertheless, observations and conclusions are based on subjective criteria rather than on the statistics. All we can do then, unfortunately, is point to the collective impressions gained in conversations and correspondence with individuals at these and other colleges.

We would, of course, be distressed if our impressions and the statistics were seriously at odds; but they were not.

We wish to extend our thanks to the many college presidents and administrators who were so hospitable to us in the course of our visits and who have been so patient and helpful during this second year of the study. We have talked with literally hundreds of individuals who are concerned not only with their own institutions' well being, but with that of all of higher education. Their opinions are valuable to us and to this study; we hope we have done justice to them and accept responsibility where we have not. We wish also to thank the Division of Higher Education-OPPE for its support (and criticisms, invariably constructive) of the study.

Cambridge, Massachusetts
August 28, 1972

I. SUMMARY

The results of the "Cost of College" study are based on data obtained from fifty four-year (with two exceptions) colleges. The data include information on revenues and expenditures, faculty, classes, enrollments, average scholastic aptitude measures, and federal student aid for each of the colleges--as well as somewhat more subjective information on the colleges' goals and constituency. The period covered is Fall 1967 through Spring 1971.

The disentangling of costs of higher education is a task in itself, but a necessary one if we are to understand the current financial malaise confronting our colleges. We can no longer assume that cost increases are inevitable and must be accepted; nor can we continue to assume that the value of a college education is necessarily so much greater than its cost that costs can be ignored.

To begin the analysis of costs it is necessary to recognize that not all institutions of higher education have the same mission or serve the same constituency--despite the fact that these can have extensive impacts on the cost of college. We have adopted the nomenclature "academic", "utilitarian", and "general" as a shorthand way of describing the constituencies of the colleges in this study. So doing permits us to separate cost impacts specifically attributable to this characteristic.

The cost of college (by which we mean total expenditures divided by number of students) rose from $2606 in 1967-68 to $3341 in 1970-71, or 28.2%, while the cost of living was rising 16.3%.

This unusually rapid inflation is generated by a variety of sources, three of which are of special interest in this study, viz., increases in faculty salaries, declining work loads,* and declining class sizes. Faculty salaries increased from 1967 to 1970 at an annual rate of 6.3%. The sharp diminution in this rate (to 3.2%) in the most recent period was offset by greater than usual declines in teaching hours and class sizes. The overall rate of cost increase has held at a fairly steady 12.6% in each of the years studied.

Initially the total cost of higher education increased at a rate significantly below this level--7.4% annually in 1967-68 and 1968-69. But in 1969-70 the total cost per student rose 11.2% over a year earlier as costs other than those directly associated with classroom instruction began to catch up.

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*Faculty hours spent in the classroom--computed on an annual basis.

Measured in terms of classroom teaching costs* the average cost of a section rose from $1092 in 1967-68 to $1427 in 1970-71, an annual increase of 9.3% over the period. But as with other costs, this increase accelerated to 14.5% in the most recent year after average gains of only 6.9% in the previous two periods.

Detailed analyses of classroom costs support this more aggregative data. The cost per student classroom hour rose 58% reflecting an expansion in the number of graduate offerings relative to all others--but also reflecting a decline in the actual number of instruction hours received per student.

Analysis of the three cost determinants noted above (faculty salaries, teaching loads, and class sizes) shows that, first, a $1,000 increase in average faculty salary will result in a $370 increase in the cost of college.** Second, a 100-hour-a-year increase in classroom teaching loads will reduce costs by $146; among the colleges in this sample, average classroom hours ranged from 400 per year to below 200. Finally, a one student increase in average class size will produce a $127 per student cost reduction.

Faculty salaries are obviously an important determinant of classroom teaching costs and hence of cost of college. Statistical analysis of faculty salaries shows that simple upward trends over time exercise the most important influence; the average is increasing at the rate of $679 annually. (Using the figures cited above, and oversimplifying a bit, this translates into a year-in, year-out increase of $251 in the cost of college.) The next most important impact is that of constituency--an "academic" college pays a $2200 a year premium to its faculty members.

Teaching loads, another determinant of cost, appear to be a function of the type of college. At "Academic" colleges faculty members spend 76 hours a year less in the classroom, other things being equal, and at public colleges they spend 36 hours more.

Class sizes are generally declining, from 22 in 1967-68 to 20 in 1969-70. The constituency indicator again seems to be significant; class sizes at "academic" institutions average 4.6 students less than at others,--and are 2 students higher at public colleges.

The relationships for both teaching loads and class sizes are not as statistically sound as we might wish, however, and so should be treated only as indicative. Teaching loads are highly significant in another way, as we shall note below.

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*I.e., that portion of total faculty salary which is allocable to specific sections taught.

**Figures cited here are subject to statistical variation described in more detail below and so should be regarded more as indicators than as hard planning data.

Earlier investigations showed that the average SAT scores of entering Freshmen was the single most powerful variable for "explaining" costs. Additional results show that a college's constituency does indeed have a powerful impact on costs--an "academic" education is $1157 per student-year more costly. We would argue that based on this result provision of students' "needs", i.e., the difference between the cost of their education and their ability to pay is preferable to a system of grants which do not take actual per student costs into account.

On the revenue side there appears to be a modest lag behind expenditures. More ominously, however, is the increasing dependence on student income--at both public and private institutions. Tuition and fees rose from 14.3% of public colleges' income in 1967-68 to 17.3% in 1970-71. For private colleges the comparable figures are 44.0% and 48.1%. State legislatures are apparently beginning to reduce their share of total support, too, but since a drop in shares was noted only in the most recent year it would be premature to suggest that a trend is developing.

The answer to the question of what all this implies for colleges' financial health depends on the definition of financial health. We have adopted, as the best analytical measure, the extent to which revenues exceed or fall short of expenditures. An extended definition of each is given below; briefly, revenues include all revenues except receipts from the sales of bonds and expenditures includes all outlays except those for plant and equipment. For public colleges, unused state funds returned to the state are considered revenues.

On a per student basis, the margin of revenues over expenditures was $125 in 1967-68, rose to $135 the next two years, then fell to $116 in 1970-71. This is a slim margin--only 3.5% in the latter year--and at no time during the period has it been adequate to cover the capital costs of college.

Statistical variation in the revenue-expense ratio (RER) is great enough to preclude our drawing firm conclusions concerning trends. Nevertheless, the RER for our sample of institutions fell from 1.05 in each of the first three years covered to 1.02 in 1970-71.

To the extent that we can accept the RER as a measure of institutions' financial health we find a close parallel between average teaching loads and institutions' financial health. In 1969 colleges whose RER's fell in the range 1.00--1.04 had average annual teaching loads of 307 hours; those with RER's of 1.05--1.09 showed teaching loads of 342 hours; and the financially healthiest colleges (RER = 1.10+) had loads of 423 hours. The relationship is clearly strong enough to justify further study.

Analysis of section costs provide some insights into areas where college management can have critical impacts on financial health. For one thing, the proliferation of graduate offerings can have extremely adverse cost effects. Although the cost of graduate sections is not excessively higher than average section costs ($1800 vs. $1473) the cost per student hour is ($9.20 vs. $1.61). A college which seeks to solve its financial problems by expanding graduate offerings is probably making a serious mistake.

Similar comments apply to the "mix" of offerings. Art sections, for example, are generally less expensive than those in the social sciences,--but in student-hour cost they are substantially higher than average. The opposite is true of sciences, although less emphatically. A college which is unaware of these effects runs the risk of unknowingly setting curriculum goals which can have unexpectedly adverse cost impacts.

The analysis of upper division vs. lower division section and student-hour costs raises important questions with respect to the role of the community colleges. With lower division costs of $1.55 per student classroom-hour and upper division costs of $2.91 per hour it is evident that to be cost-effective (one of the principal arguments of community college proponents) the community colleges must match not the total per student costs of the four-year colleges, but only their lower division costs. Conversations with administrators in states where comparative cost studies have been conducted strongly suggest that community college instruction costs are no lower than lower division costs at four-year schools.

What are the variables which influence administrative costs, which averaged $860 per student over the study period? Administrative expenses appear to be most closely related to total expenses, but some differences can be attributed to variations in the size of the institution and whether it is public or private.

Thus of each additional dollar expended for all purposes, about 25¢ will be required for administration, for each tenfold increase in enrollments the per student cost of administration will fall by $169, and public schools spend $94 per student less on administration than do private schools. The latter is possibly due to the fact that states typically undertake some administrative functions which private colleges must perform for themselves.

With comparable statistical series extending over a period of four years it is possible to begin an examination of program impacts, specifically, Federal student assistance (FSA) programs. The results of this analysis show that although the FSA programs have a statistically measurable impact on student charges--and that this impact is in the right direction--it is insufficient to offset year-to-year increases stemming from other effects. A breakdown of these shows there will be:

a.	A 10.3% increase over the previous year's charges (average $1135 per student)	$116.91
b.	A 39¢ reduction for each dollar of FSA (average $134 per student)	-52.39
c.	A constant trend increase of	56.47
	Giving a net increase in per student charges of	$120.99

Furthermore, it turns out that FSA has no statistically convincing effects on classroom teaching cost per student; if anything, the effect is to reduce CTC.

Overall, then, our analysis finds that the FSA programs are working as intended--costs to students are being reduced (albeit modestly) and the additional funds thus provided are not (however indirectly) pushing the cost of instruction up.

To conclude this summary we turn to an area of concern to which, in our opinion, too little attention has been given, viz., the possibility of an "enrollment crisis". Most studies to date have tended to assume, at least implicitly, that the cost of college is inherently uncontrollable and that the only relevant problem is that of securing an adequate level of revenues. But regardless of who pays, eventually the cost of college can outrun the value which those who pay place on it. Demographic trends make this a not-so-remote possibility.

First note that the number of young people reaching college age will continue to increase, but at a much diminished rate as we approach 1980. From 1980 the number will actually decline. Colleges will have to adjust somehow to the possibility of actual declines in enrollment; it is not clear that they have begun to make this adjustment.

The age structure of the population portends even more unpleasant--although indirect--surprises for U.S. higher education. As the downtrend in the size of younger age groups proceeds (the peak age group in 1970 was 10-year olds--the numbers in younger age groups were progressively smaller) the demand for education will diminish at all levels. In particular, the demand for teachers must similarly diminisn. Thus, the teaching professions, which absorbed some 20% of the nation's output of B.A.'s during the 1960's, will absorb under 5% of a vastly increased number of degree earners completing college during the 1970's. The flood of college graduates entering the job market--without the prospect of teaching jobs drawing off some 15% more of the total - can hardly have any effect other than to lower the value of a college degree. Students and their families will be quick to compare, unfavorably, this diminished value with continuing increases in costs,-- and college careers will be increasingly interrupted or postponed.

Some educators like to believe that they can attract increasing proportions of high school graduates into college. However, not only is this prospect inherently self-limiting (80% of California's high school graduates enter college now) but the additional youths thus attracted will be increasingly academically marginal, will need high-cost special programs, and will have high dropout rates (as CUNY's experiment with open admissions is showing).

The cumulative impact of these trends plays too small a part in higher education planning.

* * * * * * * * * *

All in all we would agree with Alice Rivlin's appraisal of the situation in higher education finance:

> "My own impression from available studies and conversations with higher educators is that there is no general crisis of high education finance. ...It is certainly not obvious that a program of general support for higher education is the appropriate answer to all or even most of [the enumerated] varied financial problems" [33]

We do feel that the results from our limited sample imply a slight worsening of colleges' financial situation during the latest year studied, even though we cannot statistically verify this impression.

In sum, it is likely that colleges are just beginning to experience the beginnings of a new kind of enrollment pressure--this time on the down side--which will increase through the 1970's. However, the problems posed by this unaccustomed challenge are manageable if institutions of higher education begin responding to them now.

II. INSTITUTIONS AND THEIR SETTING

The cost of college* is at the heart of the present concern over higher education finance. Studies show that the cost of operating our colleges is increasing at a higher rate than are the more likely sources of income. Most analysts conclude that additional sources of revenue must be found. But even though the Federal government is most frequently mentioned, the most likely source of new revenue is the student--the only source which the colleges (or States) can more-or-less adjust at will (up to a point).

At the same time, however, we assert that a primary national objective is to provide each youth with an opportunity to acquire that post-secondary education which is appropriate to his interests and capabilities--regardless of his ability to pay. It is the latter condition which is the crucial one. If costs continue to rise as they have in the past, and if income sources other than student fees remain limited, then educational opportunity must necessarily be curtailed.

However, "cost" is a remarkably slippery concept when applied to higher education. For one thing, the extreme variation in cost per student must necessarily raise some eyebrows. There is obviously more--much more--to costs than is revealed by examination of finances, enrollments, and source of support. The Cost of College was designed to provide enough information about institutions to begin to tell us why costs vary as they do, to tell us what is meant by financial health, and to tell us what some of the impacts of current Federal programs are and thus what impacts of new programs might be on the cost of college.

A. The Colleges

The extraordinary diversity of characteristics in U.S. institutions of higher education presents comparably complex problems in analysis. It obviously makes little sense to compare a large state university with

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*"Cost", unless otherwise specified, will always mean total cost as opposed to, say, cost to students or cost less auxiliary services.

a junior college unless one has a relatively large sample of each class of institution. The Coming Depression in Higher Education [8], for example, with a sample of only forty-one colleges and universities, had to draw conclusions for six different categories of institutions* and then, somewhat precariously in our view, assume the applicability of those conclusions to all of higher education.

Since The Cost of College was limited to a sample size of fifty institutions, we chose to emphasize colleges at the predoctoral level. This limitation of the population has an additional advantage. The primary mission of each of the colleges in our study is teaching; none of them would consider itself as heavily oriented toward research. We can, therefore, focus on the cost and manner in which this single mission is fulfilled apart from the impacts of other 'outputs' of higher education which often tend to obscure results.

To show how small our sample is compared to the universe, even after prescribing these limitations, compare the numbers of institutions in our sample with the total number (in parentheses) in each category:

TABLE II-1. Sample Size by Level & Control

Highest Degree Offered	Public	Private	Total
4- and 5-year	6 (89)	11 (684)	17 (773)
1st professional	-- (6)	1 (71)	1 (77)
Master's	10 (135)	15 (295)	25 (430)
Beyond Master's	4 (67)	2 (31)	6 (98)
Doctorate	1 (145)	1 (153)	2 (298)
Total	21 (442)	30 (1234)	51 (1676)

Source: [13, p. xxiii]

Of the 2,573 institutions of higher education enumerated by the U.S. Office of Education in the Fall of 1970, 1,378 comprised the level of

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*National research universities, leading regional research universities, state and comprehensive colleges, liberal arts colleges, black colleges, and two-year colleges.

principal interest in this study. One of our doctoral institutions, Clark University, is a relatively small school which shares many of the size characteristics of the other schools and the other, Portland State University, initiated doctoral programs so recently that as of Fall 1970 it had not conferred any doctorates.

The fifty colleges selected (Table II-2) include*:

20 publicly-(i.e., state-) controlled schools--
5 enrolling** 500-2,000 students,
6 enrolling 2,000-4,000 students,
9 enrolling over 4,000 students,
total enrollment-99,647-,

16 independent (private, non-sectarian) schools--
8 enrolling 500-2,500 students,
8 enrolling over 2,500 students,
total enrollment-39,056-, and

14 religious (private) schools--
8 enrolling 500-2,000 students,
6 enrolling over 2,000 students,
total enrollment-28,342.

Total enrollment in the sample institutions was 167,045. The larger relative proportion of public colleges reflects their larger enrollments. These schools in our sample had a median enrollment of 3,620 in Fall 1970; median enrollment at independent institutions was 2,031 and at religious institutions was 1,881. Mean enrollments for each school type were 4,982, 2,441, and 2,024 respectively, or 3,341 for the entire sample. The very large institution thus predominates in the public sector while religious schools tend to be more evenly distributed by size. Figure 1 shows the complete size distribution by size and control.

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*Hereafter we use the terms "public", "independent", and "religious" to designate the three types of control. SUNY at Brockport participated in the initial study but dropped out for 1970-71. Central Connecticut State College was added and was able to provide data for all four years, 1967-71, covered by our analysis.

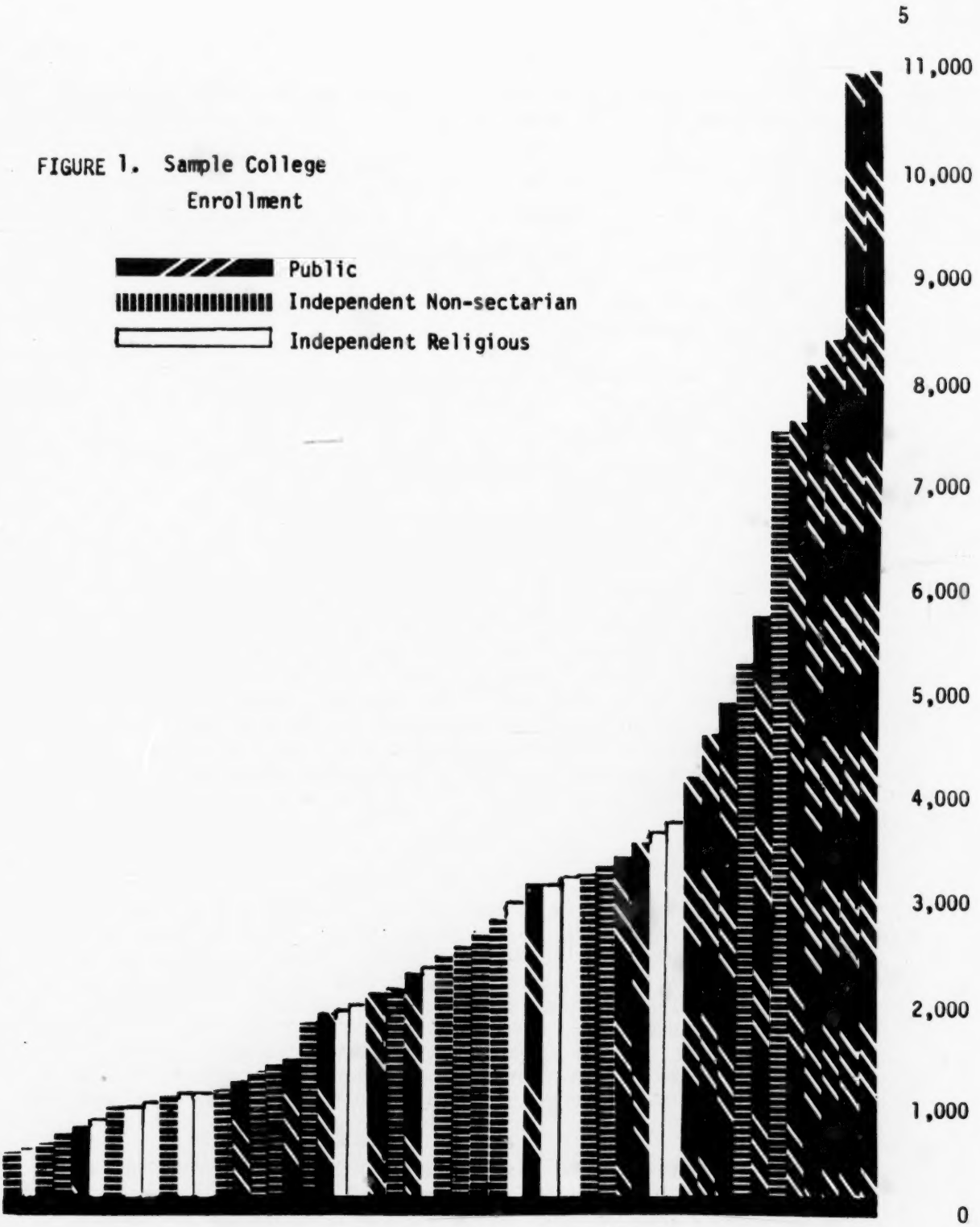
**Enrollments and type of control are taken from the U.S.O.E. Directory [37]. Enrollments used in the analyses of later Chapters generally will not agree with those used in this Chapter. Figures used in analyses are rigidly defined and usually lower than those reported in the Directory. Originally a lower enrollment limit of 500 was established; one college enrolled fewer than that in Fall 1970.

NAME OF SCHOOL	STATE	REGION	CONTROL
Bard College	New York	Mid East	Independent
Bennington College	Vermont	New England	Independent
Berea College	Kentucky	Southeast	Independent
Calvin College	Michigan	Great Lakes	Religious
Capital University	Ohio	Great Lakes	Religious
Carleton College	Minnesota	Plains	Independent
Clark University	Massachusetts	New England	Independent
Cleveland State University	Ohio	Great Lakes	Public
Drake University	Iowa	Plains	Independent
Eastern Illinois University	Illinois	Great Lakes	Public
Ferris State College	Michigan	Great Lakes	Public
Fort Valley State College	Georgia	Southeast	Public
Furman University	S. Carolina	Southeast	Religious
Humboldt State College	California	Far West	Public
Indiana University at Fort Wayne	Indiana		Public
Langston University	Oklahoma	Southwest	Public
Loretto Heights College	Colorado	Rocky Mtn.	Independent
Loyola College	Maryland	Mid East	Religious
Madison College	Virginia	Southeast	Public
University of Maine at Farmington	Maine	New England	Public
Mississippi Valley State College	Mississippi	Southeast	Public
Missouri Southern College	Missouri	Plains	Public
Missouri Valley College	Missouri	Plains	Religious
Monmouth College	New Jersey	Mid East	Independent
Montclair State College	New Jersey	Mid East	Public
U.N.H. - Keene State College	New Hampshire	New England	Public
College of New Rochelle	New York	Mid East	Independent
Nicholls State College	Louisiana	Southeast	Public
North Adams State College	Massachusetts	New England	Public
U. of North Carolina - Asheville	North Carolina	Southeast	Public
Oberlin College	Ohio	Great Lakes	Independent
Oklahoma City University	Oklahoma	Southwest	Religious
Pomona College	California	Far West	Independent
Portland State College	Oregon	Far West	Public
Prairie View A & M	Texas	Southwest	Public
University of Puget Sound	Washington	Far West	Religious
Rollins College	Florida	Southeast	Independent
St. Mary of the Woods	Indiana		Religious
St. Mary's University	Texas	Southwest	Religious
College of Sante Fe	New Mexico	Southwest	Religious
University of Scranton	Pennsylvania	Mid East	Religious
College of Southern Utah	Utah	Rocky Mtn.	Public
University of the South	Tennessee	Southeast	Religious
Spring Hill College	Alabama	Southeast	Religious
*SUNY - Brockport	New York	Mid East	Public
Trinity College	D.C.	Mid East	Religious
Tuskegee Institute	Alabama	Southeast	Independent
Washington College	Maryland	Mid East	Independent
Whittier College	California	Far West	Independent
Wilkes College	Pennsylvania	Mid East	Independent
Central Connecticut State College	Connecticut	New England	Public

*SUNY - Brockport replaced by Central Connecticut State College in 1970.

TABLE II-2. The Sample Colleges

FIGURE 1. Sample College Enrollment



Source: [11]

Note: Enrollments published in this source differ significantly from the figures developed for this study.

There is a close association between size and the level of degree offered by schools in the study:

Level	Mean Enrollment
4- and 5-year colleges	1,913
Master's	3,334
Beyond master's, predoctoral	7,971

Thirty-three states and the District of Columbia are represented. By region the representation is:

New England	6
Middle East	10
Great Lakes	
Southeast (including Texas)	10
Southwest and	
	5
	50

Classifications by type of control, region, level of degrees offered and enrollment are easy to make and so widely published. Unfortunately, these characteristics hardly ever prove helpful in explaining colleges' financial health or their costs per student. We shall find, below, that other characteristics seem to "explain" better the extent of institutions' financial and academic concern. Without necessarily rejecting the traditional classifications, we feel that analysis should give more emphasis to classifications thought to be more meaningful. (See, for example, Jenks and Reisman [24, p. 269].)

B. The Academic Spectrum

What are the characteristics of the class of colleges represented in the sample of this study? Based on American College Testing Program (ACT) results, the academic potential of their newly-admitted enrollees is higher than that of 2-year college enrollees but substantially below that of those entering Ph. D.-granting institutions (ACT composite scores are, respectively, 19.5, 18.2, 22.1 [1, p. 24]). In other respects, such as ultimate level of degree sought, students' personal goals, and factors considered in selecting a college, 4- and 5-year college enrollees appear to be similar to university enrollees [1, p. 12ff].

Concentration on predoctoral institutions for this study resulted in a sample of institutions which reflects well the varied academic needs which this institutional level fulfills. The sample includes a full range of academic standings, from the least prepossessing of the

developing institutions to the most prestigious of the small private colleges. We have some private colleges which exhibit surprising financial strength along with those which appear to function perpetually on the brink of financial paralysis.

There is also a remarkable diversity in the variety of curricular structures which are represented. Bard and Bennington, for example, offer small, distinctly offbeat programs which are also anti-university in nature, and are, significantly we think, located in essentially rural areas. For such schools relatively high tuitions are acceptable because of the highly differentiated educational product which is offered. Events, however, may be overtaking these and similar colleges so that curriculum may look less and less distinct to potential students--and less able to command premium tuitions.

Geography probably has much less to do with the nature of colleges than formerly. The University of North Carolina at Asheville is probably more similar to branch campuses of the University of Wisconsin than to Furman University, only sixty miles away.

On the other hand, geography may well influence legislative support. A Massachusetts legislator viewing the area in which North Adams State College and Bennington are both located might well wonder why the investment in North Adams need be so great when so prestigious an institution as Bennington is (in his mind) so readily available. After all, even though Bennington is in another state, since it is a private school, it accepts students without regard to residency. But what the legislator may choose to overlook is that Bennington serves a very limited constituency. In support of this observation, we note that public higher education has developed more slowly where private institutions are strongest--despite the fact that the constitutencies served are so limited as to deny educational opportunity to major segments of the college-age population.

The public colleges in our sample serve a primarily local or, at the broadest, state constituency. The same is generally true of the religious-controlled colleges, something which would not be said of their university coreligionists. Berea is perhaps unique in seeking so aggressively to identify with a specific region (Appalachia) and the special higher education needs of its youth. Its admissions policies and tuition (none) are designed for that constituency.

Public predoctoral institutions tend to have grown out of origins as teachers colleges,-distinctly pragmatic in their outlook and only very recently (as branches, perhaps, of statewide university systems) have they sought broader academic recognition. Even though they are increasingly separated from their original objective (providing teachers for the states' elementary and secondary schools), they continue to serve the same educational function, viz., that of providing relatively low cost, usually commuter, education. They will be very different from the class of institution represented by Oberlin, Carleton, and Pomona Colleges. The latter consciously seek national student representation and (consciously) prepare their undergraduates for entrance into the nation's leading graduate departments.

Our sample of black colleges reflects clearly their precarious position. Tuskegee, which is surely among the elite of all black colleges, cannot, with a faculty assertedly comparable to "undistinguished sectarian colleges or fairly typical state colleges" [24, p. 433], compete scholastically with the top, predominantly white, schools. Yet if Tuskegee cannot compete for the more able black students, what hope is there for the less (and very often much less) prestigious publicly-controlled black colleges?

A 1966 study [34, cited in 24, p. 430] showed that from 1957 to 1964 99 percent of the entering freshmen at the four least selective public white colleges in Georgia had better SAT verbal scores than the average freshman entering any of the four public black colleges in that state. It is likely that the picture has improved since then, but the costs of any substantial upgrading, that is, of improving these colleges' image to the point where they can begin to attract their share of capable students, would be very high indeed.

It will come as no surprise, however, to find that these impressions and evaluations are a subject of controversy [14, p. 26]. What is not subject to controversy is that the role of the nation's 100 black colleges will be changing, and that this change will be a result of more than just financial pressures.

The foregoing display of characteristics should show that our sample is not loaded in favor of any particular theoretical assumptions regarding colleges and their costs.

If we are successful in isolating variables which satisfactorily "explain" the cost of college in such a diverse array of colleges, then we might fairly assert even more positively than above the applicability of our results to U.S. college education generally.

The critical issue for analysis is that of obtaining comparable data from such diverse institutions.

C. The Data

The foregoing section dealt with the "differentness" of institutions of higher education. But analysis requires the ability to compare characteristics. This section deals with the elements of organization and function which can be compared among colleges.

The closest thing to a tangible educational service which colleges provide is classroom instruction. We all recognize, of course, that this is hardly the only way to provide education. Formal apprenticeship programs, especially on-the-job training, are a time honored way of providing many trades and professions with a large proportion of their preparation. Very advanced work (at say, the postdoctoral level) may involve research under the direction of a senior person. Many educators would emphasize the simple day-to-day interaction of students with and within a "learning environment". In these fifty

colleges, however, provision of classroom instruction is overwhelmingly the most important educational function. Few of them would consider themselves as having a heavy stake in research and it is quite unlikely that any would exist for long if it ceased to offer classroom instruction as its principal form of education.

Data on the classroom instruction function is thus a principal data need. These data were obtained--on a section-by-section* basis.

Classroom instruction is provided by teachers; they are by far the largest operational expense item in college budgets; data on them, their salaries, and their functions is another analytical requirement.

Finally, the colleges have resources which they must allocate among classroom instruction and the various required supporting functions. They may also, because of their non-financial resources, make resource allocations for research and public service which are essentially discretionary. Data on revenues and expenditures at a detailed level is needed for this analysis.

In addition to these basic elements, much more is needed to describe a college so that a meaningful context for the quantitative data can be constructed. For this purpose, the Cost of College uses data specifically relating to:

--application, acceptance, and academic aptitude statistics for entering freshmen**,
--enrollments (by level and major, where available), and
--detail on student aid programs, with particular emphasis on the federal EOG, NDSL, and College Work/Study programs.

The cost of classroom teaching lies at the heart of any analysis of college costs. The first step in this analysis involved matching

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*"Section" here refers to any scheduled meeting between a faculty member and students and can be considered the smallest organized educational component. Labs, lectures, and seminars are included in this definition. "Course" will refer to a separately identified (usually in the course catalog or announcement) unit of instruction. A course may be taught in a lecture section plus a lab section, in a lecture section supplemented by multiple smaller discussion sections, or may consist of a single section. The nomenclature "course of instruction", involving the full four years of instruction, is called "program" in this study.

**As measured by Scholastic Aptitude Test (SAT) scores and high school class standings. Where American College Testing (ACT) scores are used by the college they were converted to SAT equivalents [7, p. 105]. We are aware of the recent criticisms of SAT and other testing devises which note the problems associated with aptitude testing. We feel nevertheless that these averages are a meaningful measure of the average qualifications brought to the institutions by their entering freshmen.

instructors with classes as a means of computing the classroom hours per instructor and of identifying deviations from norms for further analysis. Generally, the colleges were able to explain deviations so that a firm figure for the actual cost of classroom instruction could be developed.

Analysis of expenditures and revenues was somewhat more complex. It is easy for the analyst to overlook the fact that the form of budget/expenditure classification may generate spurious indicators of basic relationships. If a school, for whatever reason, tends to maintain accountability in a form different than other schools, then its "differentness" may well be significantly related to one or more of its other characteristics. In fact, however, when comparable assignments of expenditures are made, the school may be shown not to be statistically different than the others.

The difficulty is, of course, in assuring consistency of assignments among all the colleges, a problem not unique to this study [9, p. vii]. Most analysts of higher education are now familiar with the bewildering array of accounting formats which colleges use. To cut through this jungle of definitions, restricted and unrestricted fund accounting, and frequently anachronistic state accounting requirements, we simply accepted and coded each item at the most detailed level feasible. This detail, when available, was sufficient to permit us to classify according to our own analytical schema so that data would be consistent over all colleges.

Other data proved more tractable for analysis and substantially less voluminous.

It is important to note that results here are based on analysis of colleges' own records, records which any college necessarily maintains in order to function. While the analytical interpretations of specific items of data might vary, or definitions may be questioned, the information is about as close to "truth" as one can feasibly get.

Furthermore, visits were made to each participant institution. Questionnaire-type responses, although an efficient way of gathering data, fall short if the appropriate questions are not asked. Then the college which is unique in some respect (and virtually all are) which would affect the analytical results might only be seen as a statistical aberration in the final results. Only by conducting on-site interviews with a number of administrators is one able to obtain an adequate sense of those special qualities which require more detailed answers. The simplistic "cost per student", for example, will be meaningless unless we understand the individual colleges' varying objectives and purposes. The role which a college chooses for itself can impact crucially upon costs.

The Cost of College supplements "hard" data with the more subjective evaluations gleaned from talking and working with college administrators. We wanted to know the colleges' goals and objectives, what

kinds of students theirs were, and from what kinds of families they come. It was helpful, too, to learn something of the pressures under which decisions are made, how budgets are allocated, and, in short, where the colleges were (or thought they were) going. The types of data here dealt heavily with the institutions' self perceptions, the degree to which objectives and goals could be articulated, characteristics of their client populations, and adequacy of their records.

The results of evaluation of these softer data are impressionistic and probably subjective. (It happens, however, that the hard data, on analysis, almost always supported the impressions gained at the time of the visits.)

Despite the fact that we were attempting to pave the way for a continuing association during our initial campus visits in 1970-71, responses had significantly more gaps in them for the additional year (1970-71) than we had hoped. For this reason the most recent year results exhibit greater statistical variability than earlier years and frequently show unacceptable divergences from earlier trends. These cases are noted as they occur.

D. The College Constituency

A discussion of institutions must necessarily include mention of the characteristics of those they serve in one way or another. More fundamentally, we suggest that the costs of college education are determined by certain fundamental variables relating to colleges' own perception of their role in the community, the needs and desires of its particular group of students, parents, alumni, and legislators. In short, each institution serves a "constituency" which, once established, will, however indirectly, establish in turn the cost of college at that institution.

Analysis of the constituency can help clarify why the per student cost of college can vary markedly--even wildly--among institutions. Many, possibly the majority of studies dealing with college costs, seldom go further than a simple presentation of financial characteristics and descriptions of averages and trends [23, 25]. One recent analysis shows how the management of class sizes and loads can affect costs [6] thus recognizing, as few of the other studies do, that certain variables in the cost formula are subject to control. It is not difficult to catalog reasons why costs vary:--variations in faculty salaries, teaching loads, class sizes, and non-educational expenditures (student aid for example) account for most of them. But a deeper analysis is needed to explain how these in turn came to be what they are.

The campus visits, described above, produced the collective impression that most colleges, except perhaps the most recently established, make their decisions with a very clear perception of the constituency they serve.

What this means is that "higher education" has perhaps done a better job of adapting to national needs for higher education than is generally realized. Although we may feel uncomfortable with a system which relies so heavily on the kinds of social and parental (i.e., "constituent") pressures described in, say, the HEW Task Force Study of March 1971 [21 especially Chapter 2], it is possibly because we have failed to recognize the extent to which the colleges, the students, and the community have come to terms.

The college which accepts a large proportion of students who are dubious about attending in the first place will not place many academic demands on them and might offer more in the way of social programs. Thus the needs of both parents and students can be satisfied. One college, for example, characterized its students as "coming from blue collar families anxious to have their sons move upward in social and economic status"; its programs reflect this group's needs. Another college's students come from relatively well-to-do families, but they have had troubles "fitting in" elsewhere; the program there

is academically demanding but very loosely structured. Some schools which are relatively isolated geographically serve student populations which are highly homogeneous in terms of their socio-economic status and outlook; that outlook is accommodated in those schools' programs.

Administrators, too, have their needs. J.P. Newhouse, in another context, proposes a theory which examines the effects of institutional decision-making based on prestige rather than on cost-effectiveness criteria [31]. For state schools, in addition, the legislature is a member of the constituency which must respond to a set of voters which is only partially coterminous with the set of parents whose children are seeking a college education.

Variations in the constituency can have marked cost impacts. For example, of the many college characteristics analyzed in this study, the average Scholastic Aptitude Test (SAT) scores of entering freshmen appears to be more closely related to per student costs than any other of the variables considered. Instruction costs, in fact, appear to be more closely related to SAT scores than to more direct indicators such as faculty salaries, tuition paid, or average class sizes.

Type of control is a distant second in terms of its "explanatory power" and variables such as level of federal support, enrollment, and religious affiliation lag far behind.

Our purpose in considering SAT's in this light is not so much to argue for the adoption of this as the sole analytical criterion as to point out that a college constituency, differentiated here only by SAT as an example, does have cost implications. The categories now widely-used to classify colleges (type of control, enrollment, level) must be augmented to reflect this diversity among various college constituencies. The difficulty, of course, is that "constituency" is difficult to measure; much is made of SAT's primarily because this is such an easy variable to extract and because it does seem to be closely allied to our intuitive concept of a college constituency.

For purposes of analysis we define a set of classifications which reflect in shorthand form schools' constituency characteristics, viz., "academic", "utilitarian", and "general". In using this method of classification we focus on the fact that the provision of college education "appropriate to the needs of students" implies the necessity of providing diverse kinds of college education despite the fact that some of these may be much more expensive than others.

By "academic" we mean those institutions which stress academic achievement and in which academic competition is pronounced and frequently severe. A high proportion of the graduates of these schools continue into graduate school where they tend to seek advanced degrees in academic or scholarly fields. These schools are usually the most

selective in their admissions; entrance exam scores are well above national averages. Individual attention, low student faculty ratios, small class sizes, and low teaching loads prevail. These colleges are expensive.

The "utilitarian" schools are those which attract students who see them as leading to graduate professional schools such as law or social work or into rather specific career areas such as engineering, teaching and business administration. These colleges are least expensive.

The "general" schools find their students among those who are not the best qualified academically and who are perhaps not ready to make a career commitment. They are, however, motivated either by themselves or their parents to "get a college education", as much, often, for its social value as for any career value which it offers. These colleges are largely oriented toward the reinforcement of traditional values at a more sophisticated level than the high schools provide.

Beyond the admittedly general descriptions given above, we choose to avoid specifying hard and fast criteria for classifying the schools in this sample. The specification of any school's type is, to put it bluntly, subjective and purposely vague. We will, however, show in Chapter IV that this typology is meaningful and that we can extract, through statistical analysis, characteristics associated with each type.

First, however, we wish to examine in some detail some of the concepts and some of the figures which surround college finances and their implications for educational opportunity.

III. COSTS & "SQUEEZES"

The financial problems facing the nation's colleges, especially the private ones, is a matter of common knowledge by now [8, 9, 23, 25, 30]. The problem is sharply dramatized by unusual cases like that of New York University, which is confronted with declining enrollments, the need for increased tuitions to meet rising costs, and recommendations that certain facilities be transferred to the state and the faculty be reduced by 50% [27, p. 1]. And although we cite the NYU example because it has been so well-publicized, many 4-year colleges (e.g., Parsons) are facing problems which differ only in scale or are only slightly less severe.

Balderston [4] has given a balanced review of the varieties of crisis which have arisen and, as might be expected, has found some species to be somewhat less critical than supposed. A logically-minded person might wonder how there can be so many different views of what is, supposedly, a perfectly objective set of facts. The explanation is simple--there is very little agreement on definitions of either costs or revenues in college accounting and comparisons, even from year-to-year at the same college, can be misleading.

The variable of most interest to us is total per student cost (i.e., total expenditures divided by full-time enrollments). This cost increased steadily over the four-year period covered by our study:

1967	$2606	
1968	$2806	+7.7%
1969	$3004	+7.1%
1970	$3341	+11.2%

But this cost ranged from a high of $7751 per full-time student down to $1035 in 1970-71. Instructions costs, which presumably should tend toward equality because of the homogeneity of cost elements included, ranged from $1570 down to $461.

These ranges, if not the precise figures, are supported by other studies. The Turning Point shows total per student costs ranging from $7130 down to $2531 in 1969-70 [36, p. 84]. Instruction costs similarly ranged from $2610 down to $759 [36, p. 202]. The schools in that study, it should be noted, are a fairly homogeneous group of forty-eight private four-year liberal arts colleges.

While such figures as these can be questioned on the basis that definitions vary widely (there is wide variation among schools in their choice of cost items included in "Instruction", for example) another concept, used in this study, does not allow this definitional looseness. This is classroom teaching cost, the faculty salary cost of actual classroom instruction per student.

In 1970-71 this cost varied from $1329 down to $211 per student.

What causes such variations in costs? As already suggested, we can list a number of explanatory factors. Variations in class sizes are one; average class sizes vary from as high as 30 students per section at one of our schools down to 13 at another. The more widely-used student teacher ratio ranges from 26.7 down to 9.3. The Turning Point showed a range of 17.4 down to 8.4 [26, p. 72].

Faculty teaching loads vary similarly. Faculty members, after adjusting for non-teaching assigned duties, averaged 360 classroom hours in 1969-70 at several schools but only 178 at one. Faculty salaries ranged from $14,950 down to $8,850 at the lowest non-religious school and down to $6,300 at the bottom of the entire scale.

Such variations place a heavy burden on the policy planner, who must construct programs (of institutional aid, for example) which aid those institutions in need without at the same time rewarding inefficiency. Yet in the face of the kinds of variations noted above it is difficult to separate those costs which are in some sense appropriate from those resulting from inefficiency.

Suppose, for example, a school is moving toward smaller average section sizes. Does it do so because of a feeling that this signifies excellence which, for reasons of prestige, the college (or its faculty) seeks? Is it bad management, that offerings have perhaps proliferated to the point that the more esoteric are attended by only a handful of students or is it poor scheduling? Perhaps a drop in enrollment, or even a slackening of the growth rate, catches the college unaware with too large a faculty, or expansion plans too far advanced to alter. Are faculty costs rising unnecessarily due to competition among colleges for faculty [8, p. 99-100]?

A number of these variables are described in the sections which follow. While the definitions used here will not satisfy everyone, there is enough comparability to enable us to relate revenues and expenditures to colleges' financial health.

A. Expenditures

Table III-1 shows where the money goes. The statistics exhibit sufficient variability to preclude our reaching strong conclusions concerning trends. There is little doubt, however, that "instruction" constitutes by far the major item in the cost of college, with "auxiliary services", "administration", and "facilities O & M" following at a distance. This remains true even when we apply our definition of instruction (direct cost of classroom instruction).

Trends which might be noted are the rising shares going for "public service" and "staff benefits" and the declining importance of "auxiliary services".

TABLE III-1. Distribution of Expenditures: 1967-70

Expenditure type*	Year Beginning Fall:			
	1967	1968	1969	1970
Instruction	30.7%	31.1%	30.7%	30.9%
Research	1.3	1.7	1.6	2.4
Library and Audiovisual	4.0	4.0	4.1	3.7
Facilities O & M	11.0	10.7	11.0	9.7
Administration	16.3	16.2	16.4	18.5
Student Services	2.6	2.8	2.6	2.3
Student Aid	6.8	6.9	7.0	7.2
Public Service	3.8	3.8	4.1	2.9
Staff Benefits	3.0	3.5	3.9	4.1
Auxiliary Services	20.5	19.3	18.6	18.3

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*The figures in this section are unweighted means of percentages covering the whole sample or, for breakdowns by type, they are simple means of schools falling into the various types.

Analysis of expenditures on instruction by type of institution discloses some significant differences in budget allocations:*

TABLE III-2. Instruction Expenditures as Percent of All Expenditures

Type of Institution	1967	1968	1969	1970
Academic	25%	26%	26%	26%
Utilitarian	34	35	35	33
General	33	33	32	35
Public	38	39	39	39
Independent	26	27	27	30
Religious	28	27	27	30
All Colleges	30.7	31.1	30.7	30.9

Publicly-controlled colleges aparently allocate substantially higher proportions of their total resources to instruction than do other types of colleges. This may be due, however, to public schools' tendency to make academic appointments of administrators for budgetary purposes.

"Instruction" as defined above depends heavily on schools' own definitions and so is subject to differences in interpretation. "Classroom teaching cost" is not as variable, since it is defined in terms of faculty salary costs directly allocable to classes taught. That is, only the proportion of faculty salaries which is allocable to specific sections taught is counted. Appropriate allowances are made for non-teaching duties such as department chairman, student counseling, and the like.**

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*In the analysis of this Chapter use is made of the college typology, discussed earlier, based on constituency (academic, utilitarian, general). The full discussion of the validity of these categories is deferred to the following chapter.

**Other responsibilities are not always easy to identify. In general, if we found that total classroom hours for individual faculty members fell markedly below the average for the school, then a substantial allocation (depending on information received from the schools) to nonteaching categories was made. This adjustment assured us that the costs of activities other than teaching would not be improperly allocated. Also, see Chapter II, Section D.

Using the rigorously defined classroom teaching cost (CTC) we found that it constituted the following percentages of total expenditures:

TABLE III-3. Classroom Teaching Costs as a Percentage of Total Expenditures

Type of Institution	1967	1968	1969	1970
Academic	22	22	22	22
Utilitarian	26	27	25	27
General	23	24	25	24
Public	30	32	30	33
Independent	21	22	22	22
Religious	22	22	22	21
All Colleges	24	25	24	24

Using the CTC measure we find that the cost of conducting a section (as defined above) was, by year and type of institition:

TABLE III-4. Average Cost of a Section, 1967-70

Type of Institution	1967	1968	1969	1970
Academic	1460	1718	1652	1929
Utilitarian	1071	1159	1133	1192
General	981	1134	1129	1315
Public	966	1031	1148	1119
Independent	1273	1523	1466	1779
Religious	1067	1252	1194	1397
All Colleges	1092	1274	1246	1427

We shall examine section costs in more detail below.

B. Dissecting the Cost of College

Some of the characteristics of recent increases in the cost of college are described in this section. For one thing, classroom teaching costs per student have been increasing at a rate greater than total per student costs, although the rate of increase is slackening. The increases were 15.9% from 1967 to 1968, 13.1% from 1968-69, and 10.1% from 1969-70.

The cost of classroom teaching involves three variables, teacher salaries, teaching loads, and class sizes. Each of these will be discussed in detail below, but the cumulative impact of year-to-year changes in each variable is shown in the following components of change summary:

TABLE III-5. Components of Change in Teaching Costs

Attributable to:	Percent Change from Initial Year 1967-68	1968-69	1969-70
Increase in average salary	7.0%	9.1%	3.2%
Decrease (increase) in teaching hours	3.9	(0.2)	4.9
Decrease in average class sizes	0.0	4.8	5.0
Implicit cost change	10.9%	13.7%	13.1%
Actual per student cost change	7.7	7.1	11.2
Enrollment Growth	6.2	3.0	(2.4)

The increase in salaries has noticeably slackened in the most recent period, but the difference has been made up by declines in class sizes and teaching hours. The association of productivity with teaching is not generally used in analysis. It is difficult to see how else declines in class sizes and teaching hours can be treated, however. Arguments that there is an increase in the quality of the output (however defined) commensurate with declines in teaching loads are not demonstrable--possibly because they aren't true. Jencks and Reisman present a fairly convincing case that they may not be true [24, p. 112].

We introduce enrollments in Table III-5 as a means of directing attention to a factor which may bear ominous portent for future trends in the cost of college. First, among the four-year colleges of this study, enrollments actually declined, on average, in the most recent year. We suspect this decline is not a single-time phenomenon for two reasons. For private schools tuition costs are exerting a negative influence on enrollments -- and for public four-year schools the greater availability of places at the more prestigious state universities will tend to have a comparably negative impact.

While these are matters of speculation at this point, it is of sufficient importance to lead us to make a special examination of enrollment trends in Chapter V. Our interpretation of Table III-5, however, is that the difference between the implicit cost increases shown there and the actual cost increases were sustainable only as long as enrollments were growing. When they turn down, then actual costs will tend to overtake implicit costs. A more complete analysis of enrollment impacts is given in Chapter IV.

In the following sections we examine each of a number of factors which can have impacts on costs. Continuing analysis reaffirms earlier relationships between costs and the academic ability of entering freshmen. The analyses of the following sections goes beyond the examination of this interaction to explore the way in which more direct management-controllable variables may influence costs. That is, what is the impact of trends, type of school, and size (among other variables) on each of the primary variables: faculty salaries, class size, and teaching loads?

For this examination we will look at regressions of these variables as well as tabular presentations. The advantage of the regression approach is that the coefficients which result are much easier to interpret in terms of the whole population of institutions. In particular, they permit us to view separately the marginal impacts attributable to various factors.

1. Faculty Salary Levels

Faculty salaries constitute the largest single cost element in higher education. We have already noted that classroom teaching costs are 24% of all costs; the variation among colleges is small enough to give us some confidence* that this 24% figure represents a reasonable national average for all four-year colleges. As salaries rise they obviously exert strong upward pressures on the cost of college. And they are increasing, by 3-8% in each of the change periods covered by this study.

The averages are shown in Table III-6. A recent NEA survey result for 1969-70 faculty salaries is included for comparison. Exclusion of universities from our sample probably accounts for the difference ($10,760 vs. $11,745).

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*The standard deviation of our sample mean ranges from 1.3 in 1969 to 1.7 in 1970.

TABLE III-6. Average Faculty Salaries

Institution Type	1967	1968	1969	1970	Increase 1967-70
Academic	10,183	11,208	11,922	12,818	25.9%
Utilitarian	9,237	9,672	10,627	10,377	12.3
General	8,817	9,360	10,366	10,704	21.4
Public	9,818	10,019	11,187	11,098	13.0%
Independent	9,507	10,507	11,218	11,597	22.0
Religious	8,281	9,068	9,710	10,721	29.
All Colleges	9,230	9,872	10,766	11,107	20.3%
NEA Survey [10, p. 23]			11,745		

There are obvious differences in the ability of various sectors to hold down the level of increases. The academic sector has been under heavy pressure due to the general expansion of faculties during the period -- although that expansion is now drawing to a close. Religious colleges, too, have been diminishing their reliance on contributed services -- a factor which may have something to do with their increasingly precarious financial position.

The "public" figure for 1970 is based on only seven schools in that category for which we were able to obtain 1970 data (compared with 19 in 1969). The 1969-70 decline is thus probably a result of statistical error.

The data used in Table III-6 are conveniently interpreted in the equation:

$$(1) \quad Y = 7{,}630 + \underset{(95)}{679X_1} + \underset{(259)}{2{,}185X_2} + \underset{(223)}{1{,}290X_3} \qquad R^2 = .452$$

where,

Y = average faculty salaries,

X_1 = trend (1967 = 1, 1968 = 2, etc.),

X_2 = "academic" classification*, and

X_3 = "public" classification.

The most significant impact on salaries is simply time -- salaries have gone up by $679 per year from a base of $7,630 in 1966, or 24.5% from 1967 to 1970. The rate of increase thus is larger than the simple averages of Table III-6 would imply once we account for type of institution and type of control.

"Academic" institutions' faculty salaries are a standard $2,185 higher than others', a difference less than that shown in Table III-6 once trend and control are accounted for. The amount associated with "public" institutions should be regarded with suspicion, since it is compared with both independent and religious schools taken as a single group.

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*"Utilitarian", used in the original equation was found not to be significant. Standard errors of computed coefficients are shown in parentheses.

2. Teaching Loads*

It is in teaching loads that the most marked variations among colleges occur. Adjustments in policy with respect to teaching loads, lengths of sessions, and assignment of non-teaching duties are much less visible and usually less controversial than adjustments in salary, yet they have important consequences for college costs. Ironically, most schools do not really know what their average teaching loads are--especially in annual terms--despite the fact that numbers of hours spent by instructors in the classroom seem to be closely related to institutions' financial health.**

We should note here that classroom hours will prove to be a better cost indicator than will the more generally used student/faculty ratio. The measure we prefer for expressing this relationship is total student classroom hours divided by average classroom hours per faculty member.

The student/faculty ratio will be a function of teaching loads, class sizes, and student class loads. The latter is approximately the same from school to school (typically 14-15 hours per week). The former two seem to move together rather closely, and one is about as good as the other for predicting student/faculty ratios. Although the student/faculty ratio is a widely-used measure of academic quality, it is subject to considerable manipulation. For example, the total number of academic appointees is customarily used to compute the ratio. However, adjustment for non-teaching responsibilities can produce definite upward shifts in the ratio. State institutions in particular, operate under sets of rules which make appointment of academic personnel much easier than appointment of administrators. As a consequence the colleges shift the

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*Teaching loads, in this analysis, are measured in terms of the number of hours instructors spend in the classroom. While faculty members have many other responsibilities, most would concur that this is their principal function--particularly at institutions selected for this study. To the extent that other responsibilities are formalized, we have made adjustments in the classroom hours to reflect those responsibilities. To account for variations in lengths and numbers of terms and weekly classroom hours, we compute total hours spent in the classroom during the complete school year. Since each college has its own policies concerning teaching loads, we attempted to explain deviation in hours only in terms of colleges' own norms. Faculty salaries in the analyses used here are those salaries directly ascribable to classroom hours spent in teaching specific courses or sections. Credit granted by the institution for non-teaching duties has been subtracted and appropriate adjustments made in total salaries to reflect this subtraction.

**Specifically, colleges with revenue-expenditures ratios (RER [see Section D for definitions]) from 1.00 to 1.04 had average annual teaching loads of 307 hours (1969), those with RER's from 1.05 to 1.09 had average loads of 342 hours and those with RER's above 1.09 had loads of 423 hours.

former into administrative jobs without, however, making the corresponding adjustment to student/faculty statistical indicators. In the case of one college, for example, the nominal ratio is 25:1, but after adjusting for actual teaching hours, is 30:1. Increases in this indicator of 10-15% are typical, but 20% increases are common, after adjustment.

The teaching hours equation analogous to that above is:

$$(2) \qquad Y = 349 - \underset{(18.0)^1}{79.7X_1} + \underset{(16.1)^2}{38.1X_2} - \underset{(6.7)^3}{7.9X_3} \qquad R^2 = .214$$

where,

Y = teaching hours,

X_1 = "academic" classification, and

X_2 = "public" classification.

Thus, in "academic" institutions the loads appear to be nearly 80 hours a year lighter than elsewhere and 38 hours heavier in public institutions. Both the "utilitarian" category and trend proved to be statistically insignificant. Trend (X_3) is reproduced here, however, to show that teaching loads appear to be decreasing by nearly 8 hours a year, or 2.4%.

In light of the relationship between financial health and teaching loads, we would suggest tentatively that both time and attempts to improve academic standing can have deleterious effects on financial stability. Note, however, that the multiple correlation is poor, implying that the particular variables we are examining in this section do not appear to be closely associated with teaching loads.

3. Class Size

One final determinant of classroom instruction cost is class size. Generally the trend is down as shown in Table III-7, below. The decline in the proportion of large sections (31+ students) in general schools spells financial trouble, since there is every indication that such a shift was unplanned. The "utilitarian" schools, on the other hand, although reducing the proportions of large sections, managed to prevent an offsetting increase in numbers of small sections.

Small class sizes are both a cause and effect of financial difficulty. Declines in enrollments can have severe cost repercussions unless strong management measures are taken to reduce the total number of sections offered.

TABLE III-7. Students per Class/Section

Type of Institution	1967	1968	1969	1970
Academic	20	20	18	17
Utilitarian	25	26	25	24
General	23	22	21	21
Public	23	25	24	25
Independent	22	21	20	19
Religious	23	21	20	19
Total	22	22	21	20

Generally, and contrary to expected reactions to a cost squeeze, class sizes have declined over the study period. This decline has taken the form of shifts toward smaller class sizes resulting from class proliferation, expansion of independent study programs, and trends toward seminar-like environments for undergraduate education.

As elsewhere, different types of institutions pursue class size policies in accordance with differing objectives. The academic schools naturally tend to lead the way toward smaller class sizes while the utilitarian institutions keep theirs relatively high. The differences among the three types of schools are statistically significant.

Academic institutions have apparently achieved a "mix" of section sizes which allows a stable one-third to be small. In the face of national trends for seminar-type education, independent study, etc., the general institutions are responding in an expensive way, viz., by expanding the numbers of small sections in order, in our opinion, to emulate the academic colleges. As we would expect, the utilitarian colleges are successfully resisting the trend. We would suggest, however, that both academic and utilitarian colleges have so clarified their roles and the type of education they are attempting to provide that they have long since established a class-size "mix" appropriate to their objectives.

While we have noted that the general institutions are expanding their numbers of small sections it must be pointed out that the religious-controlled institutions, which are heavily represented in the general category, are exhibiting a similar trend. This view permits a somewhat different interpretation of results, viz., that modest declines in enrollments at those colleges are shrinking class sizes. The "expansion" of numbers of small classes in this case is probably quite involuntary.

The relative importance of varying sizes of programs can have an effect on average class sizes. Colleges which enroll a higher proportion of their majors in Humanities courses, for example, will tend toward larger average class sizes than those which do not, since Humanities sections can be larger than those in other fields.

Paralleling the analyses of faculty salaries and teaching loads above, class size is associated with out variables of interest in accordance with:

$$Y = 22.1 - \underset{(0.8)}{4.6}X_1 + \underset{(0.7)}{2.0}X_2 - \underset{(0.3)}{0.6}X_3 \qquad R^2 = .318$$

where,

Y = average class size,

X_1 = "academic" classification,

X_2 = "public" classification, and

X_3 = trend.

As expected, class sizes are smaller in "academic" schools (by 4.6 students per section) and public schools tend toward larger sections. Can the latter effect be attributed to the fact that the public colleges in our sample have larger enrollments? Since enrollment was not explicitly included we have no way of telling; but other analysis shows a positive correlation (of .58) between section size and total enrollment.

Trend is marginally significant, statistically, but shows that class sizes are declining over time . "Utilitarian" was found not to be significant. As above, the reader will note the relatively low coefficient of multiple correlation.

C. Revenues

Where do colleges get their money? Table III-8 shows the revenue sources for colleges in our sample. Overall, tuition and fees are by far the major source of college inco , and despite rapid increases in state outlays over the past few years, that source still provides less than half as much as student fees at our schools. Any such presentation is, of course, incomplete unless we take type of control into account. In summary we see that public colleges derive only 16% of their income from students and nearly 60% from government sources. Independent schools are most heavily dependent on students' payments with substantial portions contributed by endowment income and gifts (8.8% and 10.4%, respectively, in 1969-70).

Colleges, through a variety of policy decisions, can markedly influence expenditures, as we have noted in previous sections. They have substantially less control over revenues. First, the most ostensibly controllable revenue item is tuition and fees. However, increasing

TABLE III-8. Revenue Distribution*

Revenue Source	Percent							
	Public				Private			
	1967	1968	1969	1970	1967	1968	1969	1970
Tuition/fees	14.2	14.1	15.2	17.1	44.2	44.3	45.9	47.7
Endowment	0.2	0.6	0.5	0.6	7.2	8.1	8.3	7.0
Gifts	0.4	0.8	0.6	0.8	10.4	10.7	10.5	10.9
State Appropriations	52.8	50.8	54.9	48.3	0.3	0.3	0.2	0.2
Other Government	7.3	8.8	7.4	7.3	1.9	2.4	2.9	4.0
Research	0.2	0.2	0.4	0.1	4.2	4.2	4.2	0.8
Educational Services	3.9	3.8	2.0	2.8	3.1	3.3	2.6	3.6
Other	1.2	1.3	0.8	1.1	1.7	1.6	1.7	1.7
Auxiliary Services	19.8	19.6	18.2	21.9	27.0	25.1	23.7	24.1

*Percentages are unweighted means of percentages for schools in the designated category.

tuition rates eventually produce enrollment declines:

TABLE III-9. Tuition & Fees Charges

	Public	Per Cent Increase	Private	Per Cent Increase
1967	$275		$1241	
1968	282	2.5%	1375	10.8%
1969	338	19.9	1542	12.1
1970	368	8.	1755	13.8

Student payments at public schools are low enough that increases on the order shown can be more easily absorbed. A comparable percentage increase at the private schools, however, turned enrollment increases, modest as they were, into enrollment declines. The trend has led the president of one major metropolitan university to suggest that unless state institutions begin charging competitive tuitions, private schools will be forced out of business [30].

Furthermore, tuition increases tend to be inherently self-limiting, if the institution is attempting to maintain a respectable program of student aid. Once tuition reaches a certain level every increase in tuition implies that students receiving financial assistance then require additional aid equal to the tuition increase. Furthermore, in the face of higher tuitions, additional students would then need assistance.

State appropriations seem to follow a logic all their own in reflecting a mixture of political and academic pressures. The rapid growth of tne past decade in this source of revenue seems now to have "turned the corner", as we will show in the next section.

Finally, although Table III-8 shows that private schools have been quite successful over the past few years in maintaining the proportion of revenues derived from private sources (primarily in the form of gifts and grants), this performance may be short-term. It turns out that many colleges have a select list of donors (including, for the religious schools, their religious group) to whom they can turn when the financial going gets rough.* These donors' generosity has not yet been confronted by the scale or regularity of demands which will arise if present trends continue unchecked. Often, too, gifts are one-time emergency donations which are given on condition that finances somehow be put in order.

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*For example, the deficits of one college have been routinely made up by a single donor during the past few years. A projected deficit of $150,000 this year, however, may put both his generosity and his bankroll to a rather more severe test than either he or the college had contemplated.

D. College Financial Health: An Overview

Because "The cost-income gap has become the subject of [such] intense interest..." [10], it seems appropriate to examine this gap in conjunction with characteristics which appear to be associated with it. In the preceding sections we noted that outlays per student for current operations increased 28% over the four-year period while revenues were increasing 25% or 8.6% and 7.8%, respectively, on an annual basis. A noticeable increase in these growth rates occured in the most recent periods.

Unfortunately, these and analog figures fail to convey a complete picture of all colleges' financial situation. Circumstances peculiar to specific colleges or classes of colleges may make the same figure mean very different things to different colleges.

We have adopted, as the best all-around analytical figure, the extent to which total revenues fall short of or exceed current operating expenditures.

The data are shown in Table III-10. Although a steady decline was apparently shown in this key measure over the four-year period, later years' indices are not statistically worse. We cannot, therefore, statistically support an assertion that colleges' position has worsened over the period despite the sharp decline in the most recent year.*

On the other hand, even an operating ratio of 105% is hardly munificent, since our definitions of total revenue and current operating expenditures exclude capital requirements.** That is, the 5% margin of revenues over expenditures must cover the capital costs of college. Put another way, colleges are receiving only $116 per year toward the capital costs of each student's education.

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*The revenue-expenditure ratio (RER) mixes expenditures, which are affected more by type of constituency and revenues, which are more closely related to type of control. Thus we would not necessarily expect type of school to affect RER.

**Operating expenditures exclude expenses not directly linked to current years' operations. Thus excluded are debt service, transfers to capital accounts, reserves, or endowment, new additions to capital accounts, funds restricted to capital uses, and depreciation (in those rare cases where the college includes it as an expense). On the revenue side, revenues from sale of debt, gains or losses from revaluation of assets, and withdrawals from reserves or endowment are excluded. It is difficult to separate many revenues into "capital" and "operating" components because of their "fungibility", i.e., ease with which either can be effectively used as the other. For example, gifts restricted to facilities can be used to cover costs of "college development" if the college chooses to capitalize those costs--or funds restricted to future year use can effectively be used as current revenue by committing them to repayment of current year "loans" from endowment.

TABLE III-10. The Revenue-Expenditure Gap

Type of institution	Revenue-Expenditure Ratio				Revenue-Expenditure Gap per Student ($)			
	1967	1968	1969	1970	1967	1968	1969	1970
Academic	103	105	104	97	150	234	241	163
Utilitarian	107	106	107	103	130	106	122	108
General	103	105	105	104	108	102	92	94
Public	103	106	106	103	89	102	93	59
Independent	107	106	104	101	171	145	91	194
Religicus	104	104	105	102	118	172	251	77
All institutions	105	105	105	102	125	135	138	116

This amount is obviously inadequate and colleges dependent on it will eventually see their facilities depreciate to the point where they can no longer support operations.

How meaningful is the RER as an indicator of financial health? The statistical analysis of Chapter IV suggests that it is very closely related to independent evaluations of institutions' financial health. For this analysis the colleges in the survey were independently classified according to their assumed eligibility for developing institutions funds. Discriminant equations* based on data from these institutions consistently demonstrated that their RER's were the most powerful measure of those tested in terms of ability to specify categories to which instutitions belonged. Financial health is not, of course, the only criterion for identifying developing institutions--but it is undoubtedly the most important one.

With the revenue/expenditure "gap" and the RER as measures of financial health, our data permit a number of generalizations.

First, as Table III-10 shows, the "gap" per student declined from $138 in 1969-70 to a meagre $116 in 1970-71, a slight 3.5% over the total student costs. This decline is not statistically verifiable, however. The RER declined from 1.05 to 1.02 during the same period.

"Academic" institutions suffered the sharpest deterioration in RER, falling from 104 to 97 percent of expenditures covered. (The latter figure is, however, subject to wide statistical error.) Colleges experiencing enrollment declines in earlier years continued to fare more poorly than all others.

Significantly, colleges which experienced a <u>decrease</u> in total Federal student aid markedly improved their revenue-expenditure position. Colleges with low acceptance standards continued worse off financially to a degree which is statistically significant. Finally, the "gap" per student for nine institutions regarded as "developing institutions" within the intent of Title III averaged $93, for the 15 colleges regarded as possibly eligible for Title III funds the "gap" averaged $103, and for 13 others regarded as financially healthy the "gap" averaged $148.

It should be noted, however, to a greater extent than was previously the case these results are subject to a high level of statistical variability. For example, the RER for all institutions had a standard deviation of 9.4 in 1969 but 13.2 in 1970. It is well to emphasize, furthermore, that the RER is strictly an analytical device and cannot be interpreted as an indicator of excessive costs and the like. Regression analysis showed, for example, no correlation between RER and administrative costs.

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*The use of discriminant functions is described in more detail below (Chapter IV, Section B).

E. Class and Student-Hour Costs

It is useful to pursue the classroom teaching cost in more detail. In particular two additional aspects of cost merit further study, viz., the average cost of running a section by discipline and by level (lower, upper, and graduate divisions) and the per student hour cost of instruction by the same categories.

In the case of the first, we are interested in comparisons of section-by-section costs because we need to be aware of the cost implications of certain proposed programs. An applicant for federal funds who wishes to expand a set of course offerings which are known, a priori, to be expensive may well be engaging in a self-defeating enterprise.

In the case of the second, if our primary interest is the availability of educational opportunity then we must be concerned with the cost of that opportunity at the most basic level. Thus, while we would not deny the student freedom of choice in selecting a curriculum, we do him and ourselves a double disservice if we do not attempt to dissuade him from pursuing a program which is not only costly to the school (and thus indirectly reduces others' opportunities) but one in which he may have little chance of success.

Costs were developed in terms of the subject areas* shown in Table III-11. Level was determined by course number, most of which are designed to convey that information to the students.**

Table III-12 summarizes the results by subject area. Trends in student-

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*Subject areas were determined on the basis of department codes used by the colleges in class lists. Needless to say department coding schemes vary widely among institutions and there is wide latitude for errors in translation. The final list contained 650 departmental abbreviations. See Appendix A.

**This is equally open to problems of translation. Fourteen separate "level" algorithms were programmed. Even so many courses fell into the "other" category. For colleges whose catalogs were vague on the subject, any course number beginning with "1" or "2" was considered lower division, "3" or "4" was upper division, and anything else was "other". See Appendix B.

TABLE III-11 Analysis Subject Areas

1.	ENGL	English composition and literature, speech, journalism, communications
2.	ARTS	Theater and fine arts, graphics, dance, music. (Includes "Appreciation" courses in these areas.)
3.	SOCI	Sociology, anthropology, psychology, religion and theology.
4.	MATH	Mathematics and computer science.
5.	P.E.	Physical education.
6.	EDUC	Education
7.	GEN	General studies, area and ethnic studies.
8.	S.S.	Social sciences, economics, government, philosophy.
9.	PREP	General occupational preparation courses (pre-law, pre-med, etc.) public service, home economics, library science, medical technology.
10.	BADM	Business administration, including agriculture.
11.	ENGI	Engineering, architecture, city planning.
12.	HIST	History, classics.
13.	LANG	Foreign languages
14.	T&I	Trade and industry, occupational preparation, office occupations, engineering technology.
15.	SCI	Natural science, biology, physics, chemistry, earth sciences, general science.
16.	XXXX	Other or unclassifiable.
17.	XX	Nonmatching department codes.

hour costs over the four-year period give ample evidence of the rise in costs:

TABLE III-12. Student-hour Cost by Level

Year	Lower Division	Upper Division	Graduate	Total*
1967	$1.04	$2.84	$2.84	$1.20
1968	1.44	2.45	2.89	1.55
1969	1.53	2.53	3.25	1.61
1970	1.55	2.91	3.87	1.90

The data show what everyone knows, viz., that upper division sections are more expensive than lower division sections. The nature of the definitions means that the additional costs are necessarily due to higher faculty salaries (upper division classes tend to be taught by senior faculty) and by faculty members with lighter teaching loads.

The data also show what everybody does not know,--that costs on a student hour basis are sharply higher for upper division courses. A number of reasons for the extent of these differences suggest themselves. For one thing, there will tend to be more specialized, and hence smaller, classes at more advanced academic levels. Most would agree that this is appropriate although it might be difficult to get agreement that the differences should be as great as the 1.9:1 ratio of our sample. For the cost-conscious institution it is evident, however, that controls on numbers and sizes of upper division courses will yield substantially higher savings than similar controls on the lower division offerings.

These statistics raise interesting questions about the cost-effectiveness of the community colleges. A major argument urging their expanded role in higher education has been that they are less expensive than four-year colleges. But it is evident that they cannot just be less expensive on a per student basis, they must be much less expensive in order to be cost competitive.

It should be emphasized that our sample schools (with the exceptions noted earlier) offer relatively little in the way of graduate programs. They, like the community colleges, do not depend on graduate teaching assistants. Only further research will reveal the extent to which the community colleges are succeeding in providing education at costs comparable with the lower division offerings of four-year schools.

Analysis of graduate offerings shows them to be more expensive than undergraduate offerings. This is a result of the fact that relatively few students benefit from them. In History, for example, although the

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*The number of schools with usable "Total" data were 43, 45, 46, and 39 in the four years 1967-70, respectively. Apparent inconsistencies may arise where the level algorithm could do no better than put a large number of classes into "other", which is not separately listed here.

total cost per graduate section is only slightly higher than the average ($1800 vs. $1473) the student-hour cost is substantially higher ($9.20 vs. $1.61). The cost figures on the previous page should make it obvious that plans for expanding graduate offerings should be subject to very close scrutiny and, in all likelihood, should be rejected far more frequently than they are. The proliferation of graduate offerings has been criticized elsewhere on academic grounds by the New York State Department of Education, which found that many master's programs reflect poor planning and coordination, are often only an extension of undergraduate programs, and frequently do not reflect that state's manpower needs [2].

The detailed data are too voluminous to permit easy generalizations, but a number of observations are appropriate.

First, although there are important differences in the per section costs between financially healthy, intermediate, and financially troubled colleges, there are even more pronounced differences by subject (1970):

TABLE III-13. Section Cost by Selected Subject Area

	Healthy	Intermediate	Troubled
Section cost:			
TOTAL	$1716	$1434	$1169
ENGL	1834	1455	1261
ARTS	1540	1294	1059
SCI	1851	1562	1449
S.S.	1874	1595	1366
LANG	1746	1346	1049
Student-hour cost:			
TOTAL	$2.27	$2.01	$1.40
ENGL	2.04	2.19	1.53
ARTS	2.93	2.02	1.66
SCI	2.28	2.03	1.59
S.S.	2.56	1.37	1.46
LANG	2.78	2.60	1.60

We may note, among other things, that financially troubled schools come closer to maintaining expenditures parities with healthy schools for Science sections than for all classes averaged. These colleges particularly lag in expenditures for foreign languages.

Second, the constituency of a school will affect differentially its emphases on academic disciplines. For example, the data below show

that utilitarian institutions' outlays on th r science programs will equal those of the academic institutions, and both will far outspend general colleges on this subject area. On the contrary, and expectedly, utilitarian and general colleges spend significantly less on History and Social Sciences and Mathematics. The largest spread appears to be in Arts.

TABLE III-14. Section Cost by College Type, Selected Subjects

	Academic	Utilitarian	General
Average per section cost (1969):			
All Subjects*	$1652	$1424	$1129
ENGL	1803	1642	1410
SCI	1900	1937	1397
ARTS	1760	1435	1093
SOCI	1808	1778	1361
MATH	1947	1353	1452
S.S.	2115	1677	1450
HIST	1895	1425	1348

The student-hour costs appear to follow the same pattern; the overall averages given above suffice to indicate general differences among the three types of colleges.

Finally, we may note that variations in total section costs by type of control tend to be quite similar over all subjects. The basic pattern of section costs (public, $1335; independent, $1466; and religious, $1194) tends to be repeated with only minor variations from subject to subject. (There are, of course, the anticipated variations in cost by subject.)

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*Averages over all subjects tend to be lower than those for the subjects selected here since the average includes general orientation and physical education courses, which are inexpensive.

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The evidence suggests that colleges experienced a slight deterioration in their financial situation in the most recent year covered by our study. The deterioration was not sufficiently large or widespread to be statistically verifiable, however.

What does appear to be certain is that costs cannot continue to rise as they have over the most recent period without adverse impacts on enrollments and on institutions' financial health. This Chapter has pointed to a number of areas in which management controls on costs can be applied.

Now may well be the critical time for applying these controls. The combined impact of cost increases and moderation of the historical growth in enrollments may well portend a crisis indeed for higher education generally and for the four-year colleges in particular.

IV. STATISTICAL ANALYSES

The preceding chapter presented a number of conclusions and observations which were developed from various types of statistical analysis. The purpose of this chapter is to provide more technical background for those results.

Specifically, we use (a) stepwise regression to identify functional relationships among per student costs and characteristic variables, (b) discriminant analysis to examine whether meaningful typologies can be established to categorize colleges according to financial health and constituency, and (c) lagged variables to quantify, if possible, the impact of past programs on colleges.

One of the difficulties encountered in these analyses was that of missing data points. In order to compute statistical relationships among a large number of variables each observation must contain all the variables. If one is missing then the observation cannot be included. This is a somewhat different situation than encountered in the computations of averages in the preceding section where all available observations were included without regard to whether observations on related variables were available or not.

Another problem involves independence of observations. We have generally treated multi-year observations of each school variable as if they were statistically independent; it is unlikely that they are--a high cost college in 1967 will still be one in 1970. The effect is to reduce the number of independent observations by three-fourths (say). In most cases, however, the number of degrees of freedom is such as not to be greatly affected and the conclusions noted below are statistically acceptable.

A. Step-Regression Analysis*

The principal purpose of this section is to extend the analysis of the previous report. The purpose of this analysis is to provide a better statistical foundation both for those earlier results and for the college-by-college analysis planned for the coming year.

1. Student Cost Impacts

In order to evaluate more specifically the impacts of the leading cost variables on per student costs, a series of regression models was constructed for the purpose of linking the two. Specifically, we wished to examine the impacts of faculty salary levels, teaching loads, and class sizes on total cost per student. Two additional variables were introduced in order to hold constant the effects associated with time trend and constituency.

Trend (using 1967 = 1, 1968 = 2, etc.) provides a means of removing externally-caused drifts upward in two variables such as faculty salary and per student expenditures. Trend did not emerge as a significant variable in any of the cases examined. That is, in any example of an upward movement, some alternative explanatory variable was found which more closely parallels the movement of the dependent variable than does a simple linear trend.

The resultant equations are (including only those variables with calculated coefficients which are statistically significant at the 5% level of confidence):

$$(4.1) \quad Y_1 = 448 + \underset{(.089)_1}{0.189X_1} + \underset{(296)_2}{2303X_2} \qquad R^2 = .551$$

$$(4.2) \quad Y_2 = -135 + \underset{(.038)_1}{0.134X_1} + \underset{(125)_2}{1001X_2} \qquad R^2 = .614$$

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*The analysis of this section uses "stepwise" regression. That is, given the specification of a dependent variable and several independent variables, the independent variable which "explains" the greatest proportion of the variance about the sample mean is regressed on the dependent variable at step one. Succeeding independent variables are introduced into the multiple regression in order of their "explanatory power" with respect to the remaining variance about the plane of regression. The number of steps taken is equal to the number of independent variables specified. The computer program is from the IBM Scientific Subroutine Package.

where,

Y_1 = expenditures per student,

Y_2 = expenditures per student less auxiliary services,

X_1 = average faculty salary, and

X_2 = constituency; academic = 1, others = 0.

Thus, a dollar increase in average faculty salaries will produce a 19¢ increase in per student cost and a 13¢ increase in per student costs less auxiliary services. Note that designation of an institution as "academic" remains a statistically significantly better indicator of per student costs than faculty salaries.

Trend was rejected as an additional explanatory variable reflecting the fact that faculty salaries and total student costs move together and that relating these two variables leaves little to be "explained" by the trend variable. We would expect faculty salaries to be more closely associated with student costs less auxiliary services than with total costs and comparison of the two equations bear out this expectation.

Both trend and the "utilitarian" variable were tested in the following relationships and were uniformly statistically unimportant.

Class size exhibits analogous effects on total per student costs:

$$(4.3) \qquad Y_1 = 3840 - \underset{(26.52)^1}{81.90X_1} + \underset{(287)^2}{2161X_2} \qquad R^2 = .581$$

$$(4.4) \qquad Y_2 = 1670 - \underset{(12.02)^1}{22.51X_1} + \underset{(130)^2}{1115X_2} \qquad R^2 = .580$$

where,

Y_1 and Y_2 are as above,

X_1 = average class size, and

X_2 = constituency as above.

A reduction of one in average class size will produce an increase in total per student cost of $82 and a $22.50 increase in costs excluding auxiliary services. As in the case of faculty salaries, the variable which is allowed to enter (academic constituency) is the more significant. The multiple correlation coefficients are not large enough to inspire great confidence, however.

Consider, finally, the relationship between teaching loads and per student expenditures. As before we evaluate the two equations:

$$(4.5) \quad Y_1 = 3027 - \underset{(1.31)}{1.99X_1} + \underset{(306)}{2385X_2} \qquad R^2 = .541$$

$$(4.6) \quad Y_2 = 1548 - \underset{(.57)}{1.04X_1} + \underset{(134)}{1109X_2} \qquad R^2 = .579$$

In this case the correlation between per student costs and the variable of interest, average annual classroom teaching hours, is not statistically significant.* And, as above, the "academic" classification is a better indicator than teaching hours. Nevertheless, the sign associated with teaching hours is correct; intuitively we suspect that costs should go down as faculty teaching hours increase.

Putting it all together, Table IV- gives results in which all variables are incorporated in single stepwise regression equations. The multiple regression coefficients are not large enough to inspire great confidence, but we do note that excluding auxiliary services improves the fit slightly. Excluding auxiliary services also changes the sequence in which elements are entered--faculty salaries enter ahead of class size as a cost predictor with that exclusion, and the last three variables (which are not significant in either case) are reversed.

The interaction among dependent variables serves to modify some of the results noted above. For predictive purposes the "model" of Table IV- is preferable to the simpler "models" described above. For example, changes in class size are found to have a much more marked effect on student costs when combined with other variables than the earlier results indicate (a one student increase in average class size reduces total costs by $127 rather than the initially-estimated $82). Similarly, faculty salaries have greater cost impacts and teaching loads less impact than noted earlier.

The constant terms are as we would expect. The last three variables can be essentially ignored, since they only increase the R-squares by 0.17 and 0.13 respectively for the two equations.

It comes as no surprise to find that the identification of an institution as "academic" provides the best single predictor of costs and that this predictor has a high statistical reliability. The policy implications are obvious, we would be willing to accept higher per student costs at "academic" colleges as a basis for Federal assistance.

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*The probability that the actual value of the coefficient equals zero cannot be shown to be less than 5%.

(4.7) $$Y_1 = 2354 + \underset{(412)}{1157}X_1 - \underset{(28)}{127}X_2 + \underset{(.11)}{0.37}X_3 + \underset{(238)}{329}X_4 - \underset{(1.12)}{1.46}X_5 - \underset{(129)}{149}X_6 \qquad R^2 = .639$$

(4.8) $$Y_1 = 600 + \underset{(180)}{500}X_1 + \underset{(.05)}{.21}X_3 - \underset{(12.2)}{44.5}X_2 - \underset{(56.4)}{84.5}X_6 - \underset{(.53)}{0.65}X_5 - \underset{(104)}{14.1}X_4 \qquad R^2 = .668$$

where,

Y_1 and Y_2 are as defined above and

X_1 = "academic" constituency (academic = 1, all others = 0),

X_2 = average class size,

X_3 = average faculty salary,

X_4 = "utilitarian" constituency (utilitarian = 1, all others = 0),

X_5 = teaching loads

X_6 = trend

TABLE IV-1. Per Student Expenditures

Standard errors of regression coefficients in parentheses.

The cost implications of including auxiliary services are substantially more pervasive than we might have supposed, a finding which strengthens the case for community colleges or which, in our opinion, makes a case for the firm organizational separation of those functions from the educational functions of the colleges. For example, a dollar increase in average faculty salaries results in a 37¢ increase in per student costs when auxiliary services are included, but only a 21¢ increase when tney are excluded. It seems that regardless of the bookkeeping practices, additional activities inevitably carry in their train additional costs.

The equations of IV- contain one item which might be of great significance, viz., that in both cases the trend variable (X_6) has a negative coefficient. The implication is that time is working in favor of lower per student costs and that the real leverage lies in strong management of the controllable variables (noting, of course, that statistical significance associated with X_6 is low).

What other variables affect costs per student? The basic controllable variables (faculty salaries, teaching loads, class sizes) are not always as apparently closely related as we would have expected.

Another analysis reveals several variables which are significant determinants of cost:

$$(4.9) \qquad Y = 1460 + \underset{(44)}{396}X_1 - \underset{(60)}{334}X_2 + \underset{(15)}{58}X_3 + \underset{(37)}{111}X_4 \qquad R^2 = .606$$

where,

Y = total per student cost,

X_1 = "academic" dummy variable,

X_2 = enrollment (log),

X_3 = trend, and

X_4 = "utilitarian" dummy variable.

Although the multiple correlation is not as strong as we might wish, the coefficients are all significant at the 1% level of confidence.

Beginning with a basic cost of $1460 per student:

(a) the ubiquitous "academic" classification adds $396 to the per student cost,

(b) returns to scale amount to a $334 reduction in cost for each tenfold increase in enrollment,

(c) costs are increasing by $58 per year independently of other factors, and

(d) a "utilitarian" designation adds $111 to the per student cost. ("Academic" and "utilitarian" are mutually exclusive categories.)

The "models" considered above produce a variety of differing and sometimes conflicting results, particularly with respect to longer term trends. Further analysis is required before we can make more positive statements on the cost impacts of certain variables.

2. Administrative Costs

The discussions in Chapter III were developed exclusively in terms of classroom teaching costs, which account for only 25% of all costs. Such a procedure is legitimate only to the extent that all other costs can be assumed to bear a constant relationship to classroom teaching costs. The purpose of this section is to examine whether this assumption is true.

For analytical purposes it is convenient to consider only "administration" and "operations and maintenance" costs in this analysis. For one thing, these costs are better defined than would be the "package" of all other costs taken together; expenditures on public service or libraries are much more apt to be a function of a college's self-perceived role. For another, if there are any costs which might be considered subject to internal control, we would expect these to be the ones.

The most direct equation form expresses administrative costs (including O & M) as a function of three variables which cover main areas of interest. The (stepwise) equations are:

(4.10) $Y = 16.44 + 0.277X_1$ $R^2 = .848$

(4.11) $Y = 589.25 + 0.266X_1 - 168.38X_2$ $R^2 = .857$

(4.12) $Y = 608.42 + 0.253X_1 - 153.43X_2 - 91.01X_3$ $R^2 = .862$

(4.13) $Y = 653.09 + \underset{(.032)}{0.227X_1} - \underset{(62.33)}{168.93X_2} - \underset{(41.22)}{93.96X_3} + \underset{(.062)}{0.056X_4}$ $R^2 = .863$

where,

Y = Administrative expenditures per student

X_1 = Total expenditures per student

X_2 = Enrollment (log)

X_3 = Public/private

X_4 = Expenditures except Admin. and Aux. Serv.

It is evident that total expenditures per student is by far the strongest predictor of administrative costs and that for the range of costs represented by our sample, approximately 23¢ of each additional dollar of expenditure per student will be for administrative costs (see 4.13).

Although the successive values of R^2 make it plain that additional variables add little, their interpretation can provide some additional insights:

(1) the coefficient of X_2 ($168.93) indicates that there are returns to scale; specifically, each tenfold increase in enrollments will reduce administrative costs by $169 (the sample mean for administrative costs is $860).

(2) Publicly-controlled colleges will spend $94 per student less than private colleges (althougn as we have observed elsewhere, a larger proportion of their administrative costs tends to be included in instruction).

(3) The fourth variable is so highly correlated with total expenditures per student (.959) that it adds little to the "explained" sum of squares and would be excluded from further analysis.

In short, it seems appropriate to adopt the simple form of equation 4.10 as our basic model and to assume that administrative costs are a standard 28% of all costs. The implication is that for each dollar increase in classroom teaching costs a roughly equivalent increase in administrative costs will be required.

These results are supported by alternative formulations of the same problem. In particular, the forced exclusion of the best explanatory variable (expenditures per student) simply resulted in the substitution of its best proxy (log of the same variable).

The simple correlation between Administrative Costs and all other costs is very strong and subject to little variation:

$$(4.14) \qquad Y = 56 + \underset{(.033)}{.516X_1} \qquad R^2 = .700$$

where,

Y = Administrative and O & M Costs per student and

X_1 = All other costs per student (i.e., total per student cost minus Y)

Since this relationship seems to be constant, we conclude that the addition of any program, including those not related to the classroom teaching function, will tend to increase administrative costs to the student. As all college administrators know, there is indeed a substantial "overhead" associated with many activities which is not always covered by the amount allocated for costs directly related to the activity.

This result is presented only because in constructing a "model" of college costs we would prefer to have costs not directly generated by the teaching function be represented as simply as possible. This R^2 is not as high as that produced by the more complex model of administrative costs, but is still high enough to justify use of 4.14 in further analysis.

3. Classroom teaching cost (CTC)*

CTC has played a crucial role in much of the analysis of Chapter 3, especially in the area of costs by level and subject. It is time to examine this variable in more detail in order to relate it to costs as a whole.

CTC is, we feel, a key variable in that it is not only controllable, but is so crucially interrelated to colleges' academic goals. The critical question is whether, once we adjust CTC by modifying salaries, class sizes, or teaching loads, the remainder of the institution's costs will adjust accordingly. The evidence suggests they will and that, in fact, total variable costs maintain a 4.02 to 1 ratio to CTC:

$$(4.15) \qquad Y = 254 + \underset{(.34)}{4.02}X \qquad R^2 = .535$$

where,

Y = total per student cost and

X = CTC per student.

CTC, in turn, is affected (indirectly through the variables noted above) by a number of variables of which

- -"academic" classification,
- -size (costs decrease with size due to increasing class sizes), and
- -faculty salaries

are all highly significant, and

- -"utilitarian" classification,
- -class sizes, and
- -teaching hours

are less so (although significant at the 5% level of confidence). Of the six coefficients associated with these variables, all have correct signs and magnitudes are generally in agreement with other results.

Briefly, we conclude that classroom teaching cost is a "well-behaved" variable with respect to other institution-wide variables and its use for detailed analysis of subject and level costs seems fully justified.

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*Refer to Chapter III, Section A, for a complete definition of classroom teaching costs.

B. Discriminant Analysis

A continuing problem of program management is that of determining whether an applicant for program funds is an appropriate recipient in terms of need, ability to use the funds effectively, and, in general, the likelihood of enhancing educational opportunity. The easy-to-measure characteristics such as type of control, enrollment, or level are not especially useful for this purpose. More direct measures, such as profit and loss, academic standing, or enrollment projections are subject to varying (and sometime biassed) judgements by the institutions themselves.

In other cases we find that classification of colleges helps us to understand better their decision-making functions and thus, indirectly, to understand better their responses to programs, financial difficulties, or competition. One typology, for example, relating to constituency (academic, utilitarian, general) has been proposed above. Another typology might be simply whether a given institution seems to be an appropriate grant candidate for Title III (Developing Institutions) funds. This section develops discriminant analyses for typologies relating to these two classifications. The objective is to identify characteristics which appear to be related to these ways of classifying institutions.*

1. The Title III classification problem.

The approach, developed here in terms of the developing institutions program, can be stated as follows: Many schools are known (by fairly objective criteria) to be "developing institutions". Many others we might suspect to be, but criteria for so classifying them are intuitive and subjective. Before classifying these schools we might wish to have a more objective, even automatic, way of examining their financial and academic situation.**

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*The computer program is taken from the IBM Scientific Subrouting Package. Also, see Anderson, T.W., Introduction to Multivariate Statistical Analysis, Wiley: 1958, Chapter 6.

**The parallel with the formal description of the discriminant problem given by Anderson is evident. Op. cit., p. 126. "The problem of classification arises when an investigator makes a number of measurements on an individual and wishes to classify the individual into one of several categories on the basis of these measurements. The investigator cannot identify the individual with a category directly but must use these measurements."

The question is whether there exist quantitative, measurable characteristics from which this "objective" classification scheme can be constructed. Intuitively we suppose that such a measure can be constructed because when we ask ourselves why we tend to regard such-and-such school as a developing institution we usually begin with a list of characteristics which are quantitative in nature. We observe, for example, that enrollments and revenues are declining, that dependence on student tuitions is increasing, etc.

Discriminant analysis offers a means of combining these and other even more diverse measures into a single measure which, when applied to a specific school, will tell us whether that school should be selected for assistance or not. Two points about this measure should be made. First, it is built up by assigning varying weights to each of several measures. Some will obviously be more effective in identifying schools in need of assistance than others, and some will be found to be useless for the purpose. Second, the measure will be subject to statistical error; some schools will be classified as developing institutions when in fact they are not and vice versa.

A priori CRA assigned each study college to one of three categories:

1. Is a developing institution within the intent of the Title III program.
2. Is possibly a developing institution.
3. Is an unlikely candidate.

This classification is based on evaluations which, although admittedly intuitive, draw on the considerable amount of background data developed for each of the colleges.

The approach is to use these colleges as a "known" group which can then be used to construct formulae for classifying any other "unknown" institution. For the first step in the analysis the six sets of variables shown in Table IV-1 were considered. Table IV-2 presents the results of the second set. The results are significant in the sense that the colleges do appear to fall into statistically differentiable categories. Table IV-2 also indicates that, using equations developed from the second set of Table variables some of our initial selections can be improved.

The circularity of definitions involved in this reclassification is of some concern. However, a closer examination of characteristics of schools which appear to have been misclassified did justify some changes. For example, predominantly black schools in our study were initially and somewhat arbitrarily considered appropriate candidates for Title III funds. It turns out, however, that most are quite well supported by

Set #	Variables
1.	a. Per student charges b. Tuition (% of total revenues) c. Instruction cost per student d. Average SAT of entering freshmen e. Year-to-year change in size of freshman class
2.	a. Revenue-expenditure gap per student b. Revenue-expenditure ratio c. Instruction cost per student d. Average class hours per instructor e. Year-to-year change in size of freshman class
3.	a. Student aid (% of total expenditures) b. Library (% of total expenditures) c. Tuition (% of total revenues) d. Year-to-year change in instruction cost per student e. Year-to-year change in average faculty salaries
4.	a. Classroom teaching cost per student b. Instruction cost per student c. Year-to-year change in enrollment d. Year-to-year change in size of freshman class
5.	a. Change in instruction cost per student b. Change in average faculty salaries c. Year-to-year change in enrollment d. Year-to-year change in size of freshman class e. Classroom teaching cost per student
6.	a. Average classroom teaching hours b. Proportion of classes with 1-10 students enrolled c. Ratio of tenured-to-nontenured faculty d. Change in average faculty salaries e. Per student charges

TABLE IV-2

their states; additional Federal assistance would have only a marginal impact.

Preliminary results based on a relatively small number of public colleges showed that some indicators of "Title III" institutions were identifiable. The more "promising" variables of those listed in Table IV-1 (based on χ^2-tests of resulting discriminant functions) were

Change in size of Freshman class,
SAT averages of freshman class,
Per student charges,
Tuition and fees (% of total revenues)
Instruction cost per student,
Revenue-expenditure gap per student,
Revenue-expenditure ratio, and
Average annual faculty teaching hours.

Variables which appear not to be useful indicators were:

Change in faculty salaries,
Student aid (percent of all expenditures).
Changes in per student instruction costs,
Changes in total enrollment, and
Tenured vs. nontenured staff ratio.

These findings are in line with our intuitive expectations.

The promising variables, combined in a single function, yield highly significant χ^2 results. That is, the likelihood of incorrectly classifying a college from the population at large is virtually nil. Furthermore, in accordance with expectations, the "unpromising" variables produce functions quite far down in the significance rankings. Other groupings produced intermediate results:

Variable Groups	D^2*
"Promising"	980
"Unpromising"	199
Student characteristics	538
Size of Institution	335
Teaching characteristics	273
Year-to-year change	272

This analysis suggests that we can isolate variables which we can confidently use for identifying likely Title III candidates.

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*Since D^2 has a χ^2 distribution with (g-1) degrees of freedom where m is the number of variables and g the number of classification groups, tests of significance involving χ^2 can be conducted,--specifically F-tests of χ^2 ratios can be examined for significance.

Based on a number of steps, the purpose of which was to improve the form of the discriminant equations, the final set of equations gave:

$$(D.1) \quad -300 + .011X_1 - .015X_2 + 171X_3 + .18X_4 - .049X_5$$

$$(D.2) \quad -342 + .018X_1 - .016X_2 + 179X_3 + .19X_4 - .048X_5$$

$$(D.3) \quad -370 + .017X_1 - .013X_2 + 176X_3 + .24X_4 - .042X_5$$

where,

X_1 = change in size of entering freshman class

X_2 = total Federal student aid

X_3 = enrollment (log)

X_4 = average SAT, entering freshman class

X_5 = revenue/expenditure "gap" per student

Study of these equations (including some results not reproduced here) shows that:

a. Products of means for each group and the corresponding variable coefficient reveal that enrollment (log) will be the major contributor to our ability to identify to which category each school will belong. The coefficients show that enrollments will more sharply differentiate category 1 schools from the other two types.* The selectivity of absolute values of enrollments would even more sharply differentiate category 1 colleges.

b. SAT's here, as elsewhere, are a significant variable. Furthermore, the coefficients monotonically increase from category 1 to category 3.**

c. The coefficients for change in size of entering freshman class (x_1) run contrary to expectations. It seems more plausible that the coefficient for category 1 would be negative, reflecting our intuitive feeling that colleges which are experiencing declines in this variable are more likely Title III colleges than others.

d. The revenue-expenditure "gap" per student is a strongly differentiating measure and monotonically increases. The mean/coefficient products even more sharply emphasize this tendency.

e. Finally, the variable total Federal student aid (x_2) principally effects a shift away from category 3. I.e., a high level of Federal student aid makes it more likely that a college is either a Title III college or borderline.

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*Recalling that any given school would be classified in terms of the largest among the three values resulting from the equations above, consider the interpretation of the coefficients for the variable "enrollment (log)". The coefficients, by group are, respectively, 170.5, 179.1, and 176.1. Consider two colleges with enrollments of 1,000 (log N=3) and 10,000 (log N =4) respectively. In the absence of any other criteria the selections would result in equation values of:

	Equation 1	Equation 3	Difference
Small College	511.6	523.3	11.7
Large college	682.1	704.4	22.3

That is, classifying the small college as Category 3 (not a Title III college) will differentially add 11.7 to the discriminant function while so classifying the larger college would contribute 22.3 to its discriminant function. The larger college thus appears more likely, ceteris paribus, not to be a Title III college.

**Technically, the three categories used here form a trichotomy. In practice, however, there is a tendency to regard each of the three groups as being measured along a scale on which category 2 is somehow preferable to category 1 and category 3 is preferable to both. We shall see below that this interpretation has other support.

How sensitive are the equations at properly designating Title III categories? The answer is given by some results relating numbers of college/year combinations which belong in one category but for which the maximum discriminant equation result occurs for another group. For this set of equations, of ten college/year observations in category 1, one maximum equation result fell into category 2; of 22 college/year observations in category 2, the equations indicate six should be classified elsewhere; of 18 observations in category 3, the equations indicate one should be in another category.

These results, in turn, cast some light on the adequacy of the developed equations as a decision-making device. For an institution randomly selected from the population, there is one chance in ten that it would be mistakenly classified elsewhere when in fact it was a category 1 college and one in
institution. The rate of error rises to one in three for category 2 colleges, but this is precisely the desired result, since those colleges' applications would presumably be subject to further analysis before a final decision could be made.

It is this lack of clear boundaries for category 2 colleges which leads to the earlier assertion that this category is somewhere between 1 and 3 on a monotonically increasing (or decreasing) scale.

The question posed initially,--are there objective measures which can be used to classify colleges when a direct classification is impractical--appears to be answered in the affirmative. In our opinion, this type of discriminant analysis offers substantial promise as a means of supporting administrative judgements on institution classification.

2. Constituency

The problem here is somewhat different from that of establishing into which category an individual is to be classified on the basis of a number of measurements. The problem here is to determine whether there is a meaningful trichotomy called "constituency" (whose categories we have labelled academic, utilitarian, and general) and, if so, what measurable characteristics tend to be associated with its categories. Hopefully, these characteristics will bear at least an intuitive relationship to the category descriptions given in Chapter II.

As in the preceding analysis, each institution was given an initial classification to see whether statistical results confirmed a tentative (and in this case quite subjective) evaluation. The variables examined were*:

a. Classroom teaching cost/total instruction cost
b. Total Federal student aid (FSA)
c. FSA/student
d. SAT average of entering freshmen
e. Percent change in size of freshman class
f. Percent change in total full-time enrollment
g. Percent change in number of FSA recipients
h. Percent change in FSA

An initial analysis showed that the original classifications of eight colleges (of a total 42) could be improved, a relatively small number given the subjectivity inherent in the original classification process. We are aware of the self-biassing nature of this procedure (discussed in the preceding section), but the revisions were generally supported by other criteria. For example, one school originally classified as a "general" college was later found to have developed a major curricular program in nursing--a program emphasis which would have qualified it as "utilitarian" by our criteria.

In accordance with the same type of test (χ^2) applied earlier, the statistical evidence for the existence of a meaningful "constituency" classification is conclusive.**

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*Because these initial analyses were undertaken before 1970 data were available and before complete editing of earlier years' data, the analysis was restricted to variables for which the greatest number of observations was available.

**The corresponding χ^2 statistic is 204.3. The probability of obtaining a value greater than 30 by chance is 0.7%.

The variables of most interest were:

a. SAT scores*
b. Average faculty salary**
c. Change in total full-time enrollment
d. Change in number of FSA recipients
e. Revenue/expenditure ratio

The discriminant function incorporating these variables is given in Table IV-3.

The resulting equations show that:

a. The coefficients for SAT scores (X_5) are similar for utilitarian and general institutions--and so tend to be a key factor in discriminating academic institutions

b. The coefficients for enrollment changes (X_4) show that academic institutions also tend to inated by their lessened emphasis on enrollment increases.

c. Similar comments apply to faculty salaries (X_3), which seem to separate academic institutions from the others.

d. But utilitarian institutions appear to join with academic colleges in their relatively greater emphasis on expanding the number of FSA recipients on their campuses.

The final issue of interest is the extent to which the formal procedure results in apparently incorrect classifications. It is well to recall, of course, that the misclassification can well be ours rather than that of the statistical procedure.

For the equations described above two of 22 school/year combinations produced equation results which suggested preferable assignments from the "academic" category; twelve of 29 should be shifted from "utilitarian"; and five of 36 should be shifted from "general". In brief, it appears that although there is statistically satisfactory discrimination among the three types of colleges based on constituency, sharper delineation of "utilitarian" institutions is required. In particular, additional work with the structure of class offerings by subjects offers the promise of better differentiation of the utilitarian colleges.

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*Individually significant at the 1% level of confidence.

**Individually significant at the 5% level of confidence.

(4.16) Academic: $-236.7 + 2.3936x_1 + .0179x_2 + .0060x_3 + .0043x_4 + .2455x_5$

(4.17) Utilitarian: $-194.8 + 2.3543x_1 + .0176x_2 + .0053x_3 + .0066x_4 + .1883x_5$

(4.18) General: $-194.8 + 2.3133x_1 + .0163x_2 + .0050x_3 + .0064x_4 + .2027x_5$

Where, x_1 = Revenue/expenditure ratio

x_2 = Change in number of FSA recipients

x_3 = Average faculty salaries

x_4 = Change in enrollment

x_5 = SAT averages

TABLE IV-3. "Constituency" Discriminant Functions

C. Impact Analysis

The results of this section are an extension of the stepwise regression analysis noted in Part A of this chapter. The "impact" of a program on an institution is rarely considered in quantitative terms. Usually we rely rather on the subjective evaluations or judgements of experts or on case studies which describe what happened in a way which presumably enables the analyst to reach his own conclusions.

On the other hand, there are a few quantitative variables which are considered significant in reaching conclusions concerning the effects of programs. An institution which is increasingly dependent on student tuitions, for example, must inevitably face the day when it is priced out of the market; we would like to examine the impacts of federal funds on this important variable. While the effects of federal student aid grants on numbers of students assisted can be easily computed, we are interested in somewhat more subtle effects of the type mentioned above.

We are also interested in longer range effects. An expenditure, the impact of which is totally dissipated in the same year, is not going to seem a very promising investment to a grantor. We prefer to think that assistance to developing institutions in enabling them to strengthen their financial and academic status to the point where further assistance will eventually become unnecessary

To examine the dynamics of year-to-year change, we have examined a model of the form--

$$Y_t = a_0 + a_1 Y_{t-1} + a_2 X_{t-1}$$

where,

Y_t is the variable of interest (e.g., student charges)

X_{t-1} is the variable whose impact is to be examined (e.g., federal aid provided in the preceding period), and

a_0, a_1, and a_2 are to be evaluated.

Suppose that a_1 turns out to be zero; then no value of X can affect Y_t--i.e., the program has no impact. If further, $a_0 = 0$ and $a_2 = 1.0$, then $Y_t = Y_{t-1}$ and the same level of Y will persist indefinitely.

Although we are interested in virtually any variable which Federal programs might affect, in this analysis we limit ourselves to only two, viz., total student charges per student and classroom teaching cost per student.

The resulting equations are given in Table IV-4. Since the program enters variables into the equations in a stepwise fashion, we may observe not only the coefficient associated with the lagged variable, but its importance relative to other variables in "explaining" the variation of the dependent variable.

Equation 4.21 of Table IV-4 was computed with nine independent variables (including the lagged value of the dependent variable). It is obvious from the successive values of R^2 that variables beyond those shown have negligible impacts on tuition and fee revenues per student. Those variables are:

a. FSA per recipient
b. Tuition as a percent of all revenues (lagged)
c. Public-private dummy variable
d. Enrollment (log)
e. Utilitarian schools: dummy variable = 1
f. Academic schools: dummy variable = 1

In short, total FSA does have an impact on student charges in the expected direction. First note that average student charges will be 10.3% greater each year than the preceding year, other things being equal. This coefficient is accompanied by a very small standard error and so is reliable. As should be expected, the correlation between student charges and itself lagged one year is very high, accounting for 97% of the variance about the mean. The impact of FSA is relatively small but in the right direction.

For the sake of comparison, consider the values involved. The average student charge, over all schools and all years, is $1135; average FSA was $134. Using these figures as a base, the year later student charges would be (using equation 4.21):

Constant	$14.04
Increase on previous year	116.91
Less FSA impact	-52.66
Trend	15.97
Total increase	$94.26

The analysis of Federal program impacts summarized in equations (4.22-24) is undertaken to establish whether those programs can be said to produce increases in instruction costs which might tend to offset the student aid thus made available.

As Equation (4.24) shows, there is a tendency to reduce teaching costs annually, although by a relatively small amount which is more than offset by the large constant term.

(4.19) $Y_t = 7.31 + 1.103Y_{t-1}$ $R^2 = .970$

(4.20) $Y_t = 56.47 + 1.106Y_{t-1} - 0.391X_{1,t-1}$ $R^2 = .972$

(4.21) $Y_t = 14.04 + \underset{(.018)}{1.103}Y_{t-1} - \underset{(.163)}{0.393}X_{1,t-1} + \underset{(15.87)}{15.97}X_2$ $R^2 = .972$

where,

Y = tuition and fee revenues per student,

X_1 = FSA per student,

X_2 = Trend (1967 = 1, etc.), and

t = Year

(4.22) $Y_t = 19.39 + 1.057Y_{t-1}$ $R^2 = .870$

(4.23) $Y_t = 458.17 + 0.980Y_{t-1} - 120.69X_{1t}$ $R^2 = .884$

(4.24) $Y_t = 488.02 + \underset{(.046)}{0.979}Y_{t-1} - \underset{(35.66)}{118.57}X_{1t} - \underset{(.122)}{0.282}X_{2,t-1}$ $R^2 = .891$

where,

Y = classroom teaching cost per student,

X_1 = log enrollment,

X_2 = FSA per student, and

t = Year

TABLE IV-4. Lagged Variable Equations

Standard error of regression coefficients in parentheses.

Federal program impacts are only noted at the third step*; the effect of enrollment size is evidently relatively more than that of FSA programs. In effect, each tenfold increase in enrollment size will reduce teaching costs by $118 per student-year. (This drops to $96 when the public-private dummy variable is introduced at step 4, attributable to the fact that the public institutions tend to be larger and so the dummy variable "picks up" part of this reduction.)

FSA per student effects a reduction in teaching costs of 28.2¢ for each additional dollar expenditure. As noted above, the value of the constant is so large that it tends to submerge the relatively slight program impacts. Statistically, however, the effect is not significant.

In summary, we conclude that the FSA programs have had relatively small impacts on these two variables, but that we should have little doubt that the impacts are there.

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*The others were FSA per recipient; the tuition/revenue ratio, and public-private control.

V. THE DEMAND FOR HIGHER EDUCATION

Higher education may well be pricing itself out of a market; if so then costs will become the crucial issue in attempting to attain equality of educational opportunity for all youths.

In this chapter we develop two themes, viz., that shifts in the population's age structure will severely moderate the increase in college age students seeking higher education and the economic value of a college education will be increasingly questioned during the coming decade. In the face of these trends the cost of college simply cannot be allowed to increase in the future as it has in the past.

Much sharper focus must be given to why youths enter college and what they expect to get from it. It is likely that we shall learn that their reasons will not be sufficiently strong to overcome ever-increasing financial disincentives.

To a large extent (we might as well admit) students

> "are training for the necessary middle-American routines which keep the paper moving down the corridors, the kids quiet, the metal in space...others are merely serving their time with sports car and football weekend, beer bust and frat party...the university is also a marriage broker's office, a job recruiting headquarters, or merely a place snugger than the army for passing a few more years." [18. p.53]

Youths continue their education beyond high school as a result of a variety of factors which have little to do with either their thirst for knowledge or enhancement of their employability. They do it because their parents expect it of them, because their friends are doing it, and because the alternatives are limited. Indeed, within the perceptions of some, continuation into college may be the only alternative in the sense that they, their parents, and their peers have all mutually programmed one another to see no other.

Participation in the four-year round of good times can become an end in itself. The "gentleman's C" was contrived as a mechanism to assure just enough study to permit everyone his rationalizations concerning pursuit of knowledge while also assuring that the "social" part of college education could persist. Indeed, for many students and their parents four years of relative indolence has itself an

intrinsic value. For many even appearance of studiousness carries a sufficiently negative connotation to push their scholarly activities into the wee hours.

It seems unlikely that the relative numbers of these students is changing much, although their means of expressing their distaste for intellectual activity has in the past few years taken on a rather more strident tone. It also seems unlikely that proposals to lower the cost of college by reducing degree programs from four to three years are going to get very far with these students or their parents. Such proposals miss the point--and usually ignore the fact that students can complete college in three years now by attending summer school and by taking on an occasional extra course.

There is another "romantic" view. This is the view that college is a mechanism for achieving a quantum movement upward in status, prestige, and income--not only for oneself, but also for one's children and their children. For those who view it in this way, the simple acquisition of a college degree is an achievement which, per se, can set them apart from their peers in a permanent and socially acceptable way. They may get C's, but not "gentlemen's C's".

The 1960's saw an important and apparently new growth in the expectations of these heretofore excluded groups concerning their own college prospects, especially as, to them, financial constraints seemed to diminish [16, p. 19]. Some of the figures summarized by Froomkin tell of this rise in expectations [16, p.20]:

Approximate Family Income Percentile	Percent with plans for college in: 1959	1965
0 to 17	23%	46%
18 to 30	40	52
31 to 49	52	65
50 and over	68	74

While the foregoing discussion has been cast in terms of blue-collar vs. white-collar expectations regarding the promise offered by college attendance, it is strongly supported by observations that non-whites, more than whites, tend to regard college as the key to upward mobility [Froomkin, using data from ref. 22, p. 29]. An expanding base of prospective students who associate a "quantum" value with a college degree is desirable from colleges' point of view; we shall see below, however, that this expansion carries certain inherent limitations.

Now it is evident that the cost of college is two different things to these two classes of student. (We have so far ignored a third type, the "grind", for whom intellectual achievement, per se, is a valued objective.) In the former case a college education is nearer to a consumer service while for the latter it is an investment.

The latter is willing to place a very high value on a degree simply because of the "quantum" nature of the rewards offered. The former type of student will ascribe a smaller value since his family and social circumstances usually tend to make it unlikely that he would gain or lose much either way. So too, the student who perceives a major utilitarian value to himself in completing college is likely to be the very youth who is very much aware of the alternatives open to him, viz., that unless he goes to college he will almost certainly go to work. For him the economists' "income forgone" is a meaningful concept which will, indeed, affect his decision. For the youth who has been "programmed" to college, income forgone as an additional cost is about as plausible as adding income forgone by tourists to the total cost of tourism.

Higher education has had a situation in which the pool of those taking a utilitarian view of college has been vastly larger than those who were "programmed" into college irrespective of costs and values. That is, the clientele has, on average, placed a high value on education.

Happily, such a view seemed to match nicely the demands of the economy, which also placed a high value on educational attainment. The rapidly developing technology of the post-World War II era generated apparently insatiable demands for skilled manpower. The occupational structure (Table V-1) clearly shows the effects of these demands. Professional, technical, and kindred workers made up only 8.2% of the work force in 1940 but 14.2% in 1970. Meanwhile, laborers, farm workers, and operatives make up 26.4% of the working population, down from 42.2% thirty years earlier and 37.3% only ten years earlier. Note that these are shifts in the entire work force and so, during each ten-year period, were brought about almost completely by those entering or leaving the labor force during that period. Of those youths entering the labor force from 1960-70, some 18% entered the professional/technical occupational category.*

Theoretical work by economists supported this real world experience. The exposition of the "Leontief paradox" [29] showed that contrary to theoretical expectations, the U.S. exported a high proportion of goods in which the labor content was substantially greater than the labor content of goods of which we were net importers. Since the U.S. is a comparatively high wage country, such a result seemed paradoxical. Leontief's solution was that the type of labor contained in goods was crucial, and that contained in U.S. exports was evidently technologically superior to that embodied in competing foreign goods.

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*Assuming 25% attrition of the original workforce in each occupation. Such an assumption does ignore the age structure by occupation; the average age in the professional/technical areas is probably lower than average and so would tend to reduce the percentage figure given here.

TABLE V-1. Occupational Structure of the U.S. Labor Force

	1940	1950	1960	1970
Professional/Technical	8.2	9.0	11.4	14.2
Managers, officials and proprietors	8.4	9.2	10.7	10.5
Clerical workers	10.1	12.6	14.8	17.4
Sales workers	7.1	7.2	6.4	6.2
Craftsmen and foremen	11.9	14.3	13.0	12.9
Operatives	18.6	20.4	18.2	17.7
Nonfarm laborers	7.2	6.3	5.4	4.7
Services: other	7.4	7.9	9.2	10.4
: private household	4.8	2.6	3.0	2.0
Farm workers	16.4	10.6	7.9	4.0

[22, p. 216 and 36, p. 194] Figures for 1940 and 1950 include all workers 14 and over; for 1960 and 1970 data cover workers 16 and over.

Everyone knows that the U.S. exports jet aircraft (in which the labor content is high) and imports textiles (in which the labor content is also high). But everyone also knows that the labor skills which go into a jet are technologically superior to those going into textiles. The U.S. exports skilled management, engineering, and specialized consulting services to virtually every nation with whom we have trade relations--these exports are nearly as labor-intensive as one can get.

The U.S. system of higher education provides the driving force for this marked (but diminishing) superiority. It was indeed a remarkable stroke of good luck that the U.S. chose to reward the men returning from World War II with educational opportunity rather than equivalent monetary bonuses.

Meanwhile, the demand for more and better higher education was being justified by work which seemed to show a direct relationship between earnings and level of education [5, 13]. The rate of return to education was shown to be significantly higher than market rates. Hannoch [19] showed that as a result of the expected increment in salary the internal rate of return on proceeding from a high school diploma to a bachelor's degree was 20% in 1959. Even the return for completing a four year degree rather than dropping out of college along the way was an impressive 12%.

Thus, although no one quite knows what higher education's outputs are, there seem to be ample arguments that they are both desirable and valuable. If anyone were to doubt it, he need only to have observed the growth in higher education during the 1960's. Enrollments increased 122% to 7.92 million by Fall 1969, and total expenditures for higher education grew 180% during the decade to $24.9 billion in Fiscal Year 1970.

With growth at this rate, and with--apparently--no end to it in sight, a permanent assumption of unlimited growth came to be an integral part of colleges' plans for the future. By the late 1960's, however, the assumption was increasingly facing a harsher reality. Cheit, in The New Depression in Higher Education [8] set the tone by examining the financial prospects of colleges--and finding them bleak. Other prospects may be even more bleak.

Consider first the age structure of the population. Figure V-1 projects the population which will turn 19 each year to 1985. While an average of 63,000 youths were added to that age group annually during 1965-70 for an increase of 9.2%, the comparable 1970-75 increase will fall to 8.4%, 1975-80 will show a decline of 1.4%, and the 1980-85 decline will be 15.9%. Ultimately, colleges will have to face the prospect of declines in total enrollments. But they are, on the contrary, projecting increases in first-time enrollments, of 26.3% during (Fall) 1969-74 and 15.3% during 1974-79.

What are the prospects for expanding the proportions of youths who go to college? Part of the growth of the 1960's resulted from a twenty percent increase (to 60%) in the proportion of all high school

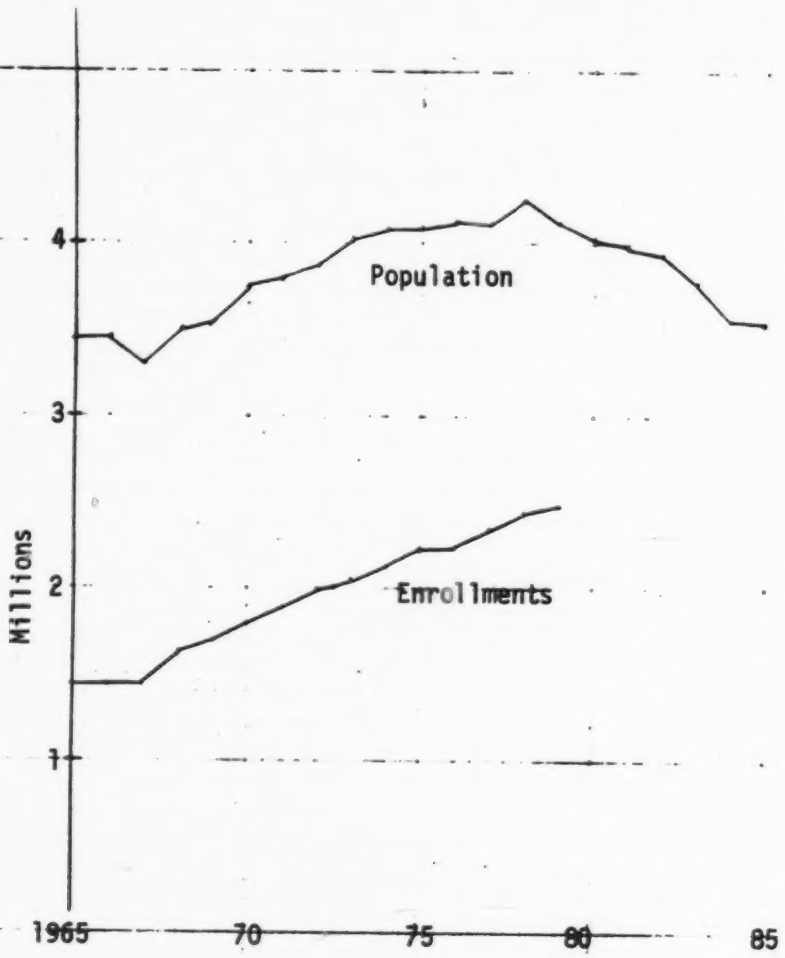

Figure V-1. Population Reaching Nineteen Years of Age and First-time College Enrollments [Projected].

graduates who continued into college; possibly this increase will be repeated in the next decade. We do have a large group of prospective college students who feel strongly about the potentialities of a college education on their own chances for upward mobility (the "quantum effect" described earlier) and who, at the same time, see the financial barriers falling right and left.

Unfortunately, their aspirations often are not realistic in light of their abilities. Among minority high school seniors some two-thirds of those with very low verbal test scores expect to continue into college, or half again as many, proportionately, as from among white students scoring at the same achievement levels [13, pp. 20-21].

Obviously, we can make special efforts to bring these students into college. But equally obviously the deeper we dip into the pool of less qualified and less motivated students the more will drop out. The experience of CUNY is illustrative [15]. With the relaxation of all entrance requirements, freshmen who would not have been previously admitted entered as freshmen in Fall 1971. CUNY charges no tuition, is highly regarded academically, and has campuses geographically easily accessible to all parts of the city. The dropout rate increased dramatically, reaching 40% among some groups. Although the results available should not be treated as conclusive, one would anticipate that as increasingly marginally-qualified students are enrolled their dropout rates would approach 100%. As the institution devotes an increasing share of its resources to the problems of these youths, and away from the traditional academic functions, those who are initially qualified and motivated will look for a better deal--i.e., they will start "dropping out" to enroll elsewhere. Presumably a "breakeven" point will be reached where the new students attracted by lowered standards will be offset by increased attrition rates among all students at that campus. Additional data of the type available from the CUNY experience will enable us to estimate this breakeven point.

Indeed, the experience of the 1960's, with its perhaps too rapid growth is finally leading us to give serious thought to who "ought" to go to school in the first place. A statement by the Assembly on University Goals and Governance makes the point quite specifically:

> "Colleges and universities ought to be open to those who are able and ready to benefit from association with them; this implies that those who attend choose to be there. Any arrangement that seems to enforce attendance, that causes some to believe that they are coerced into attending, violates the spirit that ought to prevail in these institutions. Men and women of all ages--and not only late adolescents and young adults--need to think of the college or university as a place they can turn to if they can benefit from the kind of learning environment that it provides. There are many matters that can be taught in modern society outside the university; there are some that can be taught only inside the university. An obligation of all institutions of higher education is to define

> more clearly what their particular educational strengths and criteria for admission are, so that students will know which educational opportunities are available where. These institutions should help employers and others to see that there are other ways of certifying many employment capabilities than through college attendance alone." [3, p. 7]

For the individual college the implication is that it must focus ever more sharply on the characteristics of its constituency and its needs; careless pursuit of the wrong students can well yield short term benefits at the cost of long term disaster.

It is true, of course, that a vast and relatively untapped source of students might exist in the over-25 population, a prospect made especially attractive as the post World War II crop of babies moves into those ranks. The "Open University" concept is one of the better publicized attempts to generate a demand for higher education in those age groups, as are the various plans for expanding programs for continuing education. But success on any large scale, despite the attractiveness of the costs to student, has yet to be demonstrated.

In short, it is a virtual certainty that the inexorable arithmetic of the population's age structure will result in some diminu in the demand for higher education. If other factors affecting the demand remain unchanged, the diminu should be modest.

Suppose, however, a college degree turns out to be something less than the guarantor of jobs and the "quantum jump" in socio-economic status we mentioned above. Simple exercises with the statistics on higher education provide disquieting insights. For example, the teaching profession itself has historically absorbed a high proportion of degree earners. As long as the education industry was itself growing, this proportion could be sustained at a relatively high level. When that growth began to diminish--at the same time there was accelerated growth in the output of degrees--the proportion who might expect to find jobs in education declined precipitously, as Figure V-2 shows. We suspect that this historically solid demand for some 20% of all college graduates has disappeared--permanently, for all practical purposes.

Indeed, the recession of 1970-71, cutting into research and technology budgets more than ever before, fell heavily on the degree holders, especially the engineers and scientists whose skills had been so eagerly sought for two decades.* While the severe impacts of that period were the result of what might best be regarded as an economic aberration, it is unrealistic to expect a return to the demands of the past.

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*See, for example, Ginzberg [17]. Ginzberg, though hardly enthusiastic, is probably slightly more optimistic than is justifiable. The long-term elimin of a market for some 20% of all graduates will persist regardless of economic ups and downs.

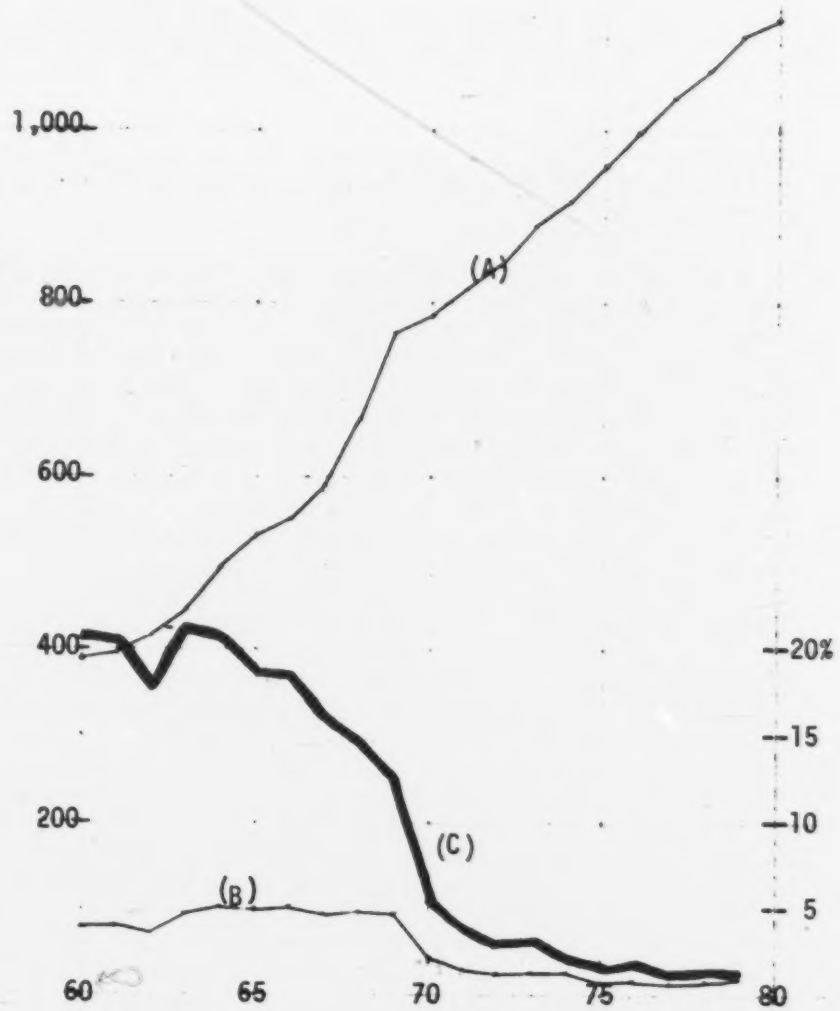

Figure V-2. Academic Demand vs. Degree Output

(A) Actual and projected Bachelor's and First-professional degrees granted.

(B) Net implicit required additions to teaching staffs.

(C) Teacher requirements as percent of degree output, right scale.

Source: [4, pp. 42, 57, 67]

The statistics on earnings and education agree, although not conclusively. In 1959 median income of college degree holders was 40% more than the median income of those who had stopped after completing high school; in 1969 the difference was slightly less at 39%.

It turns out, awkwardly enough, that the slowdown in the growth of the market is occurring at a time when some of the heretofore accepted ideas concerning the economic value of a college degree are being questioned. In fact, schooling appears not to make much of a contribution to earnings of low achievers, precisely the groups for which hopes were highest [20]. Even at the professional level critical questions are being brought up by those who are most closely involved in education...

> "For those who want to do more than pass through to a career...college has much to offer for its cost. The offering takes the form of perspectives, understanding, and insights rather than lucrative techniques and productive skills....[However] not all persons find such an education to their taste or in their interests; some may wish to pursue a career as immediately as possible, postponing until later, or doing without, the contribution education might make to their lives. At present, choice is denied. Entrance to a career is through college, where schooling all too often is masked as education." [28, p. 192]

These studies question the value of a college education, in itself cause for concern. Coupled with an apparent inability to control the cost of college the ubiquitous benefit-cost ratio must swing against the colleges. No one knows how great a swing it will take to affect enrollments.

Suppose, however, that an ever-increasing number of youths cannot attach a "quantum" jump value to a college education because their parents attended college. That is, the number of blue-collar and farm families, whose children will associate an exceptionally high value to earning a college degree, is diminishing. Regardless of the actual economic value of a degree, perceptions of the increment to be gained in socio-economic status by investing four years of time and money, coupled with increased questioning of its helpfulness in job-seeking, must surely lead many to turn away from college, if not immediately upon graduation from high school then later in mid-college career.

We need not suppose that a large number of institutions will necessarily close their doors as a result of these trends, but analysis of colleges' characteristics must necessarily proceed against a backdrop of trying but inexorable effects on the demand for their product.

VI. THE COLLEGE ROLE

In summary, we cannot support the conclusions elsewhere [7, 25, 30] that higher education in general is facing a discouragingly bleak financial future. Of the views presented by Balderston [4], we feel that of Alice Rivlin is most accurate. She concludes that the system has a great deal more room for adjustment of expenditures than some seem to feel.

The relevant question is whether educational opportunity* is in danger. It is not whether colleges face curtailment of some programs, slippage in their academic standing, or, for a few, closing their doors. We feel that educational opportunity is not significantly threatened by its present financial condition.

We do feel, however, that many of our colleges need to define more clearly their goals, understand better their constituency, and plan for the kinds of costs (and revenues) thereby implied.

One unfortunate aspect of continued cost increases is that they are shifted onto the students and their families. In actual dollar terms the cost to students is increasing at the rate of $98 per year, even after accounting for the public-private difference ($950) and the increase in expenditures per student (14% of which is passed on to the student even after allowing for the annual increase).**

Perhaps more significant is the shift in the structure of revenues, with increasing reliance on the student at precisely the time when colleges are attempting to reach further down in the socio-economic scale. The percentage figures observed in Chapter III, regressed on time and per student expenditures show that the share of total costs borne by the student is increasing at a rate of 2.6% per year.

Among our colleges we have seen the cost of an "academic" education remain at about 2 1/4 times that of a "general" education over the period. But the absolute cost of the former has grown to $5,306 per year, a level which is beginning to act as a significant deterent to continued support from either students or legislatures. We have noted already the adverse effects of sharp tuition increases

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*We differentiate between educational opportunity and education. Thus we seek to provide equal educational opportunity rather than an equal education.

**All figures significant at the 1% level of confidence.

on freshman class sizes. The level of student charges will particularly chip away at the private schools' constituency; the difference is simply too great, even allowing for the fact that in percent of cost the differences are less striking:

Average student revenues (1970)

	Public	Independent	Religious
Dollars	$368	$1994	$1477
Percent of cost	17.3%	48.3%	7.9%
Percent of cost less aux. serv.	20.9%	57.8%	57.8%

Once one begins to question the value of education per se, then decisions will be increasingly made on average cost rather than cost-benefit comparisons.

One other aspect, the relative shift of enrollments from private to public has been too little analyzed in terms of ultimate impacts on the private institutions. In our sample this shift shows up even over the brief four years covered; the public schools enrolled 56% of the students covered in our sample in 1967 and 63% in 1970. And our sample does not include teh community colleges, the most rapidly growing segment of higher education.

Now it is clear that the graduate of a private institution will ascribe a high value to a private education for his sons and daughters which then represents an added cost he might be willing to incur in addition to the presumed higher value per se. But the proportion of private colleges graduates in the population will be declining, and the public school alumnus is unlikely to accept willingly the cost differential noted above.

All in all, we regard continued erosion of the relative importance of private education as inevitable. Eventually, although not, perhaps, for some decades, private higher education may well find itself in a role comparable to that of private secondary education now.

The analyses presented in the preceding chapters support both the concept of institutional diversity and the possibility that our usual thought categories tend to be unnecessarily restricted. We have argued that college "constituency" provides a more meaningful way of looking at colleges and their individual ways of handling aspects of the current financial malaise which affect them than the more familiar categories.

Each college must, of course, be free to vary its programs to meet the needs of its own constituency. Although we have suggested that year-to-year productivity declines have been a major contributing factor inflating the cost of college, we have carefully avoided any inter-college comparisons of productivity.

Once a college assumes a particular role for itself (and it is the task of management and planning to confirm the realism of that role) a number of other decisions--class sizes, total enrollment, faculty salaries--automatically follow. The college, in responding to the needs of its clientele, is best qualified to determine how to meet those needs. What we do not accept is that within a college over a period of time the response should necessarily always be in the direction of lower productivity.

High cost institutions may well require permanent assistance, particularly if, as our evidence suggests, high costs are associated with high college qualifications and motivation. Federal assistance will be especially needed as more of the highly qualified but economically disadvantaged enter the high-cost institutions.

Nevertheless, colleges can make more realistic projections given the type of constituency they serve* This report has stressed the constituency category because it is, in our opinion, the single most important factor to be taken into account in institutional planning.

Analysis of other typologies is much needed but little undertaken. The most used categories (viz., type of control, level, size) are, for most analytical purposes, unhelpful. (One exception is that of analysis of costs incurred by the students, for which differentiation by type of control is obviously appropriate.)

Given sufficient detail, alternative typologies can be constructed for a variety of analytical purposes, as demonstrated by our development of the "Title III" categories. That analysis showed that the "Title III" colleges are characterized by smaller enrollments, low teaching loads and class sizes, and relatively heavy dependence on tenured staff. They also tend to be those which allocate relatively less of their budgets to instruction and more to student aid, public service, and research. Other colleges demonstrate opposite characteristics and, in addition, show relatively low participation in

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*One college, at least, expects to bring in all the additional enrollments it wishes by lowering entrance standards, since it has a large pool of highly motivated, highly qualified students which it can tap. But, as the preceding chapter suggests, lowering standards for freshmen may result in an automatic, and unintended, lowering of standards for all levels and the untapped pool might well melt away.

Federal student aid programs, tend to accept virtually every applicant, and have comparatively low SAT score averages.

Analysis by constituency, however, reveals the dilemma. Some colleges are high cost because of the constituency served and in so serving it are getting into financial difficulties. Other colleges are high cost because they are inefficient. The ideal program would provide generally unrestricted assistance to the former, but assistance to the latter should come with a package of management improvement incentives.

The problem of separating high costs inherent in the constituency served and high costs due to inefficiency (where inefficiency includes unanticipated changes in variables which act to increase per student costs) is still to be solved. Suppose, however, that we treat the equations explaining per student cost as a "model" of cost. Then we can estimate what each college's cost "should be". (For example, the cost per student "should" decline as enrollments increase.) In those cases where actual costs were found to exceed the norm we might conclude that there is room for management improvement.

More importantly, we would get away from the over simplified "high cost" vs. "low cost" dichotomy and move toward the recognition that different kinds of education will be needed as long as there are different kinds of people--and they will carry different price tags.*

A lack of planning and failure to make realistic appraisals of prospects may already have made major negative contributions to colleges' financial prospects. Most assume that revenues can always be increased by increasing enrollments; the preceding chapter makes it clear that dependence on this way out is not practical.

Indeed, it can be catastrophic. Suppose that, with the enrollment surge of the 1960's etched in their minds,--and deciding that enrollment expansion provides the answer to its financial problems-- a college management undertakes all those things appropriate to expand. Additional faculty members are hired, salaries raised, and tenure awarded, all steps which are inherently irreversible. The financial "crisis" for this school begins when the expected enrollments fail to materialize.

Our data suggest that the most recent declines in class sizes and teaching hours (in the face of a very small 1969-70 salary increase) were attributable to less-than-expected enrollment increases or actual enrollment declines.

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*It is a curiousity that the highest cost programs are found at the two extremes of the academic spectrum; the most intellectually challenging on the one hand and the vocational-technical programs on the other.

As another area for improvement, it appears likely that too limited analysis of many non-instructional programs may be leading some schools into more than appropriate involvement in public service activities.* For example, the needs which summer, evening, and extension programs meet are seldom spelled out; even less well analyzed is the extent to which programs which are established finally meet those needs. Presumably market criteria largely determine whether these programs are viable, in the sense that direct instructional costs are usually met from tuition.

However, should public service programs carry their fair share of administrative and facilities costs their financial viability would be a much shakier proposition. The economist is particularly skeptical of assertions that such costs are necessarily fixed; our analysis shows that administrative and physical plant operation and maintenance together constitute a constant one-third of all expenditures, public service, and auxiliary services included. If the latter expand, the former will expand proportionately.

Finally, planning must increasingly take account of the cost implications of various decisions. Little is known, generally, about the differences in costs from subject-to-subject and among levels. Our results show that there are differences and that they are probably greater than most administrators suppose.

It would be quite inappropriate, for example, for a college experiencing financial difficulties to attempt an expansion of its science programs at the upper division level. Such decisions, in the absence of cost data, are often justified on the grounds that more students can be thereby attracted--a line of reasoning that the discussion of the preceding chapter calls into question.

During the period covered by this study the federal student aid programs were virtually the only mechanism for providing federal assistance to the four-year colleges. Despite the fact that this income is restricted, it represented a source of funds which, for colleges seeking to expand their aid programs, were essentially discretionary. By freeing resources which might otherwise be encumbered by competing priority demands, the federal programs have served the dual purpose of aiding the student and the institution. By studying the impact of these programs we can anticipate the impacts of new, as yet untried, programs.

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*"Public Service" here includes summer, evening, and extension programs. These are almost always budgeted apart from the regular day sessions and direct costs are usually met from tuitions or from specific governmental grants. Generally, the indirect costs are not covered although grants will frequently carry an additional allowance to the college for that purpose.

The impacts which the federal aid programs have had on both students and institutions can be divided into a discussion of benefits and problems. Statistical analyses of the budget allocations at all of the schools studied have indicated that federal student aid as a proportion of tuition and fees has a definite, although weak, impact on the pattern of expenditures at these schools. Federal aid as a variable alone cannot be associated with changes in the pattern of expenditures. However, when cross-classified with other factors, it is shown to affect allocations. In fact, a very strong association between federal aid, enrollment change and resource allocations was determined to be statistically significant, an association which suggests that federal aid is permitting colleges to grow by providing them more leeway in the allocation of their resources. Assuming then that benefits do accrue to institutions from federal aid programs, it is possible to assess more precisely the impact which changes in this program have upon participating institutions.

Beyond these general characteristics the statistical analyses of Chapter IV permit some much more specific conclusions. In particular we were able to observe there that FSA funds achieved their objective of reducing the cost to the student, but at a rather high cost. We observed, furthermore, that assistance could not be shown (statistically) to have been "diverted" into higher costs (specifically, into classroom teaching costs).

Thus, the impact of Federal funds is in the right direction. With an appropriate impetus toward more effective planning we would conclude that the dollar-for-dollar payoffs in terms of educational opportunity can be significantly expanded.

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Appendix A. Department/Subject Assignment

Institutions have adopted a wide range of subject and course designations for individual offerings. By far the most common form of course designation is an alphabetic departmental designation plus a course number. The latter typically incorporates a "level" code, described in Appendix B.

The CRA system classifies the departmental code into one of broad subject categories. In those cases where a numeric department designation is used, that numeric code is also assigned to a subject area. Where we could locate specific exceptions to general rules, these were programmed into the classification system.

For purposes of this report, CRA has further summarized the forty-three subject areas noted in Table A-1 into the fifteen categories of Table III-11. Summary statistics on the latter are cited in the report.

LIST OF DEPARTMENT ABBREVIATIONS

Table A-1

CRA	#	INST.
P.E.	27	A
EDUC	41	A-V
BA.T	6	AC
BA.T	6	ACC
BA.T	6	ACCT
PHS	28	ACSC
XXXX	42	ACT
AGRI	2	ADM
EDUC	41	ADMN
ENGI	14	AE
ENGI	14	AERO
A.E.	1	AFR
AGRI	2	AGEC
EDUC	41	AGED
AGRI	2	AGEN
AGRI	2	AGR
AGRI	2	AGRI
AGRI	2	AGRN
AGRI	2	AGRO
AGRI	2	AGRY
ENGI	14	AISC
A.E.	1	AMST
AGRI	2	ANID
AGRI	2	ANSC
ANTH	3	ANT
ANTH	3	ANTH
T.I.	40	AP
T.I.	40	APS
T.I.	40	APSC
ARTS	4	AR
ENGI	14	ARCH
EDUC	41	ARED
ARTS	4	ARMU
ARTS	4	ARP
ARTS	4	ART
ARTS	4	ARTH
ARTS	4	ARTI
ARTS	4	ARTS
A.E.	1	AS
A.E.	1	ASIA
A.E.	1	ASP
A.E.	1	ASS
PHS	28	AST
PHS	28	ASTR
ARTS	4	AT
P.E.	27	ATH
EDUC	41	AUDO
T.I.	40	AUTO
EDUC	41	AV
ANTH	3	AY
B.AD	5	BA
BIOL	7	BACT
B.AD	5	BAD
B.AD	5	BADM
P.E.	27	BALL
MUSC	26	BAND
BIOL	7	BGY
BIOL	7	BI
LIBR	22	BIB
LIBR	22	BIBL
BIOL	7	BIO
BIOL	7	BIOL
BIOL	7	BL
BIOL	7	BO
BIOL	7	BOT
BIOL	7	BOTA
B.AD	5	BSAD
B.AD	5	BSAD
EDUC	41	BSED
BIOL	7	BTN
BIOL	7	BTNY
BA.T	6	BU
B.AD	5	BUAD
B.AD	5	BULA
BA.T	6	BUS
BIOL	7	BY
T.I.	40	C E
T.I.	40	CARP
ENGI	14	CE
T.I.	40	CF
CHEM	9	CH
H.EC	19	CHDE
H.EC	19	CHDV
CHEM	9	CHE
CHEM	9	CHEM
LANG	21	CHI
LANG	21	CHIN
CHEM	9	CHM
MUSC	26	CHMU
LANG	21	CHN
MUSC	26	CHOI
MATH	24	CHS
CLAS	10	CL
CLAS	10	CLA
CLAS	10	CLAS
CLAS	10	CLG
CLAS	10	CLL
H.EC	19	CLO
H.EC	19	CLOT
MUSC	26	CMUS
ENGL	15	COL
C.S.	8	COM
C.S.	8	COMP
HIST	20	COMU
C.S.	8	COSC
GOVT	18	CPOL
T.I.	40	CRAF
T.I.	40	CRFT
C.S.	8	CS
C.S.	8	CSC
CHEM	9	CY
T.AR	39	D S
ARTS	4	DAD
AGRI	2	DAIR
AGRI	2	DARY
AGRI	2	DASC
EDUC	41	DE
BA.T	6	DFAD
T.AR	39	DM
T.AR	39	DNS
B.AD	5	DOBA
T.AR	39	DR
T.AR	39	DRA
EN.T	13	DRAF
T.AR	39	DRAM
T.AR	39	DRDA
T.I.	40	DRFT
T.AR	39	DRM
T.AR	39	DS
LANG	21	DUTC
T.I.	40	E F
T.I.	40	E S
PHS	28	EASC
ECON	12	EC
GEOL	17	ECGE
ECON	12	ECN
ECON	12	ECO
ECON	12	ECON
EDUC	41	ED
EDUC	41	EDCA
EDUC	41	EDU
EDUC	41	EDUC
T.I.	40	EE
ENGI	14	EG
EN.T	13	EGSC
T.I.	40	ELCT
T.I.	40	ELEC
ENGL	15	EN
EDUC	41	ENED
ENGL	15	ENG
ENGI	14	ENGI
ENGL	15	ENGL
ENGI	14	ENGR
ENGL	15	ENL
EDUC	41	ENLE
BIOL	7	ENTO
GEOL	17	ENVS
GEOL	17	ERSC
GEOL	17	ES
PHS	28	ESCI
ARTS	4	F A
ARTS	4	FA
T.AR	39	FASH
T.I.	40	FDRY
H.EC	19	FDS
ARTS	4	FIAR
B.AD	5	FIN
B.AD	5	FINC
AGRI	2	FISH
B.AD	5	FN
H.EC	19	FOOD
AGRI	2	FOR
AGRI	2	FORE
T.I.	40	FOUN
LANG	21	FR
LANG	21	FRE
LANG	21	FREN
LANG	21	FRLA
LANG	21	FRN
EDUC	41	G
BA.T	6	GB
BA.T	6	GBUS
GEOL	17	GE
PHS	28	GEGE
GEOL	17	GEL
GEOL	17	GEO
GEOL	17	GEOG
GEOL	17	GEOL
LANG	21	GER
LANG	21	GERM
PHS	28	GESC
GEOL	17	GGR

LIST OF DEPARTMENT ABBREVIATIONS Page 2

CRA	#	INST.
GEOL	17	GGY
GOVT	18	GIR
CLAS	10	GK
GEOL	17	GL
GEOL	17	GLY
GOVT	18	GOV
GOVT	18	GOVE
GOVT	18	GOVM
GOVT	18	GOVT
LANG	21	GR
CLAS	10	GRE
CLAS	10	GREE
CLAS	10	GREK
CLAS	10	GRK
LANG	21	GRM
S.S.	35	GS
GOVT	18	GT
EDUC	41	GUID
EDUC	41	GUND
GOVT	18	GV
GEOL	17	GY
H.EC	19	H EC
P.E.	27	H PE
P.E.	27	H&PE
H.EC	19	HE
P.E.	27	HEA
LANG	21	HEB
H.EC	19	HEC
H.EC	19	HECO
EDUC	41	HED
EDUC	41	HEED
HIST	20	HI
EDUC	41	HIED
HIST	20	HIS
HIST	20	HIST
P.E.	27	HLE
EDUC	41	HLED
P.E.	27	HLS
P.E.	27	HLTH
H.EC	19	HMEC
XXXX	42	HNS
H.EC	19	HOEC
XXXX	42	HON
XXXX	42	HONO
AGRI	2	HORT
P.E.	27	HPE
P.E.	27	HPER
HIST	20	HS

CRA	#	INST.
HIST	20	HST
P.E.	27	HTH
G.S.	16	HUM
G.S.	16	HUMA
PUBL	33	HURE
HIST	20	HY
T.I.	40	IA
SOC.	38	IDEO
S.S.	35	IDS
ENGI	14	IE
T.I.	40	INAR
XXXX	42	INNO
B.AD	5	INS
XXXX	42	INT
S.S.	35	IS
LANG	21	ITA
LANG	21	JAP
LANG	21	JAPA
COMM	11	JN
COMM	11	JOU
COMM	11	JOUR
CHEM	9	LABS
LANG	21	LANG
CLAS	10	LAT
CLAS	10	LATI
CLAS	10	LATN
PREP	31	LAW
LIBR	22	LBSC
PREP	31	LE
LIBR	22	LIB
LIBR	22	LIBR
LIBR	22	LIBS
ENGL	15	LING
ENGL	15	LIT
ENGL	15	LNG
LIBR	22	LS
EDUC	41	LSE
CLAS	10	LT
MATH	24	MA
XXXX	42	MA C
T.I.	40	MACH
T.I.	40	MAS
T.I.	40	MASH
T.I.	40	MASN
T.I.	40	MASO
MATH	24	MAT
MATH	24	MATH
B.AD	5	MBA

CRA	#	INST.
T.I.	40	MCSH
S.S.	35	MC20
EN.T	13	ME
PHS	28	MET
T.I.	40	META
PHS	28	METE
LANG	21	MFL
B.AD	5	MGMT
B.AD	5	MGT
B.AD	5	MK
B.AD	5	MKT
B.AD	5	MKTG
LANG	21	MLF
LANG	21	MLG
LANG	21	MLJ
LANG	21	MLR
LANG	21	MLS
M.S.	23	MLSC
B.AD	5	MM
B.AD	5	MNGT
XXXX	42	MP E
P.E.	27	MPE
P.E.	27	MPW
SPED	37	MR
M.S.	23	MS
MATH	24	MT
MATH	24	MTH
MUSC	26	MU
MUSC	26	MUC
EDUC	41	MUED
PREP	31	MURS
MUSC	26	MUS
MUSC	26	MUSC
MUSC	26	MUSE
MUSC	26	MUSI
PREP	31	N E
AGRI	2	NARE
PHS	28	NAS
PREP	31	NE
AGRI	2	NR
PHS	28	NS
PHS	28	NTSC
PREP	31	NUR
PREP	31	NURS
A.E.	1	NWES
A.E.	1	NWST
PREP	31	NYRS
BA.T	6	OA

CRA	#	INST.
GEOL	17	OCE
GEOL	17	OCEA
GEOL	17	OCEN
AGRI	2	OCN
BA.T	6	OFAD
GEOL	17	OILT
MUSC	26	ORCH
PHYS	30	P
P.E.	27	P E
GOVT	18	P SC
P.E.	27	P.E.
B.AD	5	PD
P.E.	27	PE
P.E.	27	PE M
P.E.	27	PE W
P.E.	27	PE-M
P.E.	27	PE-W
P.E.	27	PEA
P.E.	27	PED
P.E.	27	PEH
P.E.	27	PEM
GEOL	17	PETC
P.E.	27	PFW
P.E.	27	PE21
PHIL	29	PH
PREP	31	PHAR
PSYC	32	PHCH
P.E.	27	PHE
P.E.	27	PHED
P.E.	27	PHEM
P.E.	27	PHEW
PHIL	29	PHI
PHIL	29	PHIL
PHIL	29	PHL
PHS	28	PHS
PHS	28	PHSC
PHIL	29	PHUL
PHYS	30	PHY
PHYS	30	PHYS
PHIL	29	PL
AGRI	2	PLIN
T.I.	40	PLMB
GOVT	18	PLS
AGRI	2	PLSC
T.I.	40	PLUM
B.AD	5	PN
GOVT	18	POL
GOVT	18	POLS

LIST OF DEPARTMENT ABBREVIATIONS Page 3

CRA	#	INST.
GOVT	18	POSC
PHIL	29	PR
T.I.	40	PRIN
T.I.	40	PRNT
GOVT	18	PS
GOVT	18	PSC
PSYC	32	PSCH
GOVT	18	PSCI
PSYC	32	PSCY
PSYC	32	PSH
PSYC	32	PSY
PSYC	32	PSYC
PSYC	32	PSY2
PSYC	32	PY
P.E.	27	PZ
AGRI	2	RAMA
P.E.	27	REC
RELT	34	REL
RELT	34	RELG
RELT	34	RELI
ENGL	15	REM
XXXX	42	RES
BA.T	6	RET
LANG	21	RL
AGRI	2	RM
LANG	21	ROLA
LANG	21	RSN
LANG	21	RUS
LANG	21	RUSS
S.S.	35	S S
SPCH	36	S&D
ANTH	3	SA
SOC.	38	SC
EDUC	41	SCED
PHS	28	SCI
SPCH	36	SD
SPED	37	SE
BA.T	6	SESC
SOC.	38	SICO
LANG	21	SLA
S	35	SLSC
	35	SLST

CRA	#	INST.
ENGL	15	SNM
SOC.	38	SO
SOC.	38	SOC
SOC.	38	SOCI
S.S.	35	SOCS
SOC.	38	SOL
S.S.	35	SOSC
S.S.	35	SOST
SPC	36	SP
LANG	21	SPA
LANG	21	SPAN
SPCH	36	SPCH
SPCH	36	SPDM
SPCH	36	SPDR
SPCH	36	SPE
SPCH	36	SPEC
SPED	37	SPED
SPCH	36	SPEE
SPCH	36	SPE4
SPCH	36	SPH
LANG	21	SPN
BA.T	6	SS
MATH	24	STAT
EDUC	41	SUPV
SOC.	38	SY
T.AR	39	T A
T.AR	39	TA
T.AR	39	TAR
RELT	34	TH
T.AR	39	THAR
T.AR	39	THE
T.AR	39	THEA
RELT	34	THEO
BIOL	7	UJBL
XXXX	42	UNI
XXXX	42	VAL
B.AD	5	VBUS
AGRI	2	VESC
AGRI	2	VTSC
AGRI	2	WAMA
T.I.	40	WDWK
T.I.	40	WELD

CRA	#	INST.
AGRI	2	WIMA
AGRI	2	WLDM
AGRI	2	WM
P.E.	27	WPE
XX	43	XX
BIOL	7	ZOL
BIOL	7	ZOO
BIOL	7	ZOOL
CLAS	10	04
B.AD	5	10
EDUC	41	15
ENGL	15	20
BIOL	7	2002
BIOL	7	2003
B.AD	5	2004
B.AD	5	2005
B.AD	5	2006
BA.T	6	2008
ECON	12	2010
BA.T	6	2011
B.AD	5	2012
BA.T	6	2014
CHEM	9	2016
T.I.	40	2018
ENGL	15	2024
ARTS	4	2028
MUSC	26	2030
T.AR	39	2032
LANG	21	2034
LANG	21	2036
LANG	21	2037
LANG	21	2038
LANG	21	2040
LANG	21	2042
MATH	24	2046
PHIL	29	2048
PSYC	32	2050
P.E.	27	2052
PHYS	30	2054
PHYS	30	2056
HIST	20	2058
HIST	20	2060

CRA	#	INST.
GOVT	18	2062
SOC.	38	2064
ANTH	3	2065
EDUC	41	2066
SPCH	36	21
ARTS	4	24
H.EC	19	26
T.I.	40	28
EDUC	41	29
LIBR	22	30
LANG	21	41
LANG	21	42
LANG	21	45
LANG	21	46
MATH	24	50
S.S.	35	58
MUSC	26	60
PHIL	29	63
PSYC	32	65
P.E.	27	70
P.E.	27	71
P.E.	27	72
P.E.	27	73
P.E.	27	74
P.E.	27	75
P.E.	27	76
P.E.	27	77
P.E.	27	78
P.E.	27	79
PHS	28	80
BIOL	7	81
CHEM	9	82
PHYS	30	83
PHS	28	84
S.S.	35	90
ANTH	3	91
ECON	12	92
GEOL	17	93
HIST	20	94
GOVT	18	95
SOC.	38	96
S.S.	35	99

Appendix B. Course Level Assignment

Development of classroom teaching costs by level requires that some method for identifying courses by level be available. Although the CRA class data provide for identifying the academic level of courses, seldom are they so identified by institutions. Most do, however, generally indicate by, say course number, whether a course is a lower, upper, or graduate division offering. It is these course numbers which are analyzed by a computer algorithm which then assigns courses (and their accompanying data) to levels.

Rules vary, to put it mildly; some fourteen "rules" were revealed by an examination of the form of class reporting and institution's catalogs. Most schools, however, use the most popular course-numbering; the remainder are scattered. Some colleges do not codify course level at all; some, in fact, do not even assign course numbers. In other cases, no unambiguous assignment could be made, for example, where course numbers 100-199 are courses "primarily for sophomores and juniors". In these cases the courses were arbitrarily assigned to the lowest of any included levels.

It should be noted that the assignment of courses to divisions does not necessarily imply that students enrolling in them necessarily have attained the same level. Many sophomores enroll in courses primarily for upperclassmen and vice versa.

Rule #	Lower Division	Upper Division	Graduate	Other*
1	1-99 or Roman Numeral	100-199	200-299	300-399
2	100-299	300-499	500-899 or XXX	0-99
3	100-199	200-299	300-399	
4	1XX	2XX 3XX		
5	1000-2999	3000-4999		
6	FXX 1XX	2XX	3XX	
7	1-29	30-70		
8	100-299	300-499	500-599	600-699
9	0-199	200-399		
10	10-39	40-49		
11	10X-20X	21X-39X		
12	11-29	30-59 and 75-79	100+	60-70 and 80-85
13	100-299	300-599	600+	
14	Refer to "level" designation in class list record.			

*Plus any numbers which fail to conform to categories 1-3.

TABLE B-1. "Level" Algorithms

TABLE B-2

"RULES" for determining division/level of courses

RULE #	NAME OF SCHOOL
2	Bard College
--	Bennington College
2	Berea College
11	Calvin College
10	Capital University
7	Carleton College
	Central Connecticut State College
6	Clark University
2	Cleveland State University
1	Drake University
2	Eastern Illinois University
2	Ferris State College
2	Fort Valley State College
12	Furman University
1	Humboldt State College
2	Indiana University at Fort Wayne
5	Langston University
--	Loretto Heights College
--	Loyola College
2	Madison College
3	University of Maine at Farmington
2	Mississippi Valley State College
2	Missouri Southern College
9	Missouri Valley College
2	Monmouth College
2	Montclair State College
2	U.N.H. - Keene State College
2	College of New Rochelle
2	Nicholls State College
--	North Adams State College
4	U. of North Carolina - Asheville
--	Oberlin College
2	Oklahoma City University
1	Pomona College
2	Portland State College
2	Prairie View A & M
2	University of Puget Sound
2	Rollins College
2	St. Mary of the Woods
13	St. Mary's University
3	College of Sante Fe
1	University of Scranton
2	College of Southern Utah
--	University of the South
1	Spring Hill College
8	Trinity College
2	Tuskegee Institute
2	Washington College
1	Whittier College
3	Wilkes College